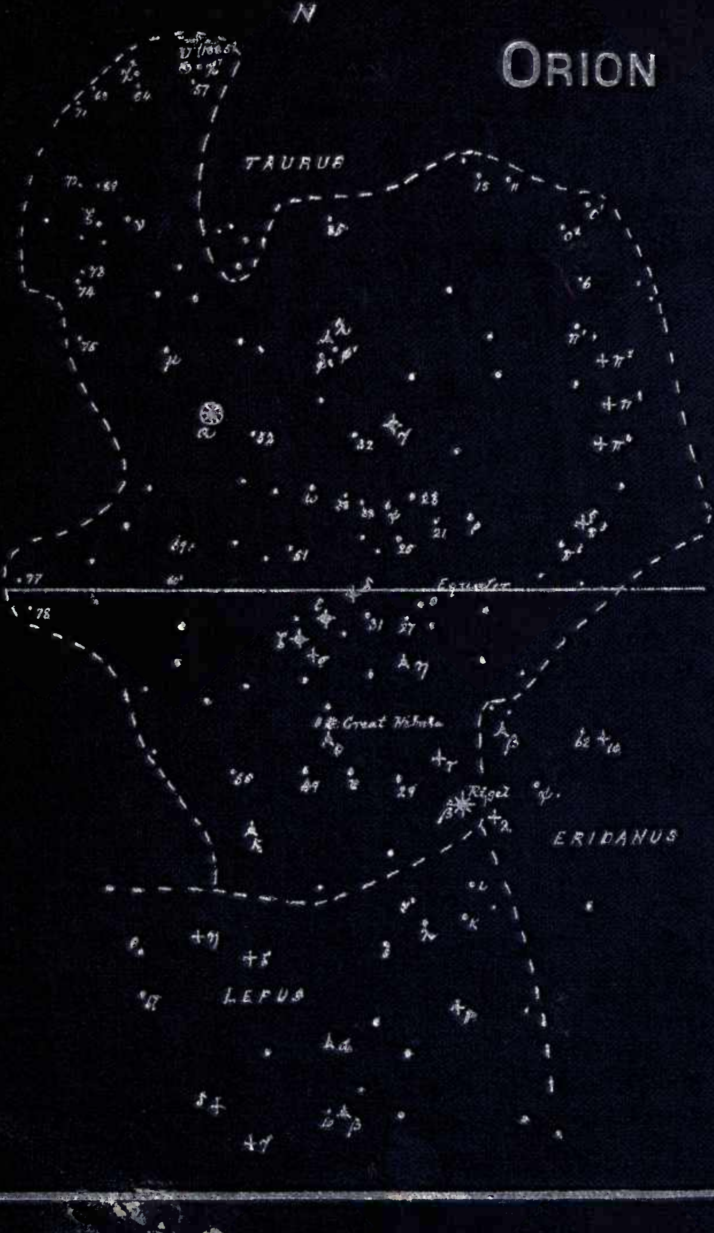
UC-NRLF
B 4 520 617

GROUPS


N
ORION
TAURUS
Equator
Great Nebula
Rigel
ERIDANUS
LEPUS

J.E. GORE, F.R.A.S.

TY

LIBRARY

LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA

STRONOMY LIBRARY

LIBRARY
OF THE
ASTRONOMICAL SOCIETY
OF THE PACIFIC

363

W. Steadman Aldis.

STAR GROUPS

A Student's Guide to the Constellations

BY

J. ELLARD GORE

F.R.A.S., M.R.I.A., ETC.

Honorary Member, Liverpool Astronomical Society

AUTHOR OF "THE SCENERY OF THE HEAVENS," "PLANETARY AND STELLAR STUDIES"
"ASTRONOMICAL LESSONS," "SOUTHERN STELLAR OBJECTS," ETC.

Capio Lumen

LONDON
CROSBY LOCKWOOD AND SON
7, STATIONERS' HALL COURT, LUDGATE HILL
1891

[*All rights reserved*]

ASTRONOMY LIBRARY

LONDON:
PRINTED BY J. S. VIRTUE AND CO., LIMITED,
CITY ROAD.

QB63
G67
1891
ASTRONOMY
LIBRARY

PREFACE.

THE following little maps are intended as an aid to the beginner in acquiring a knowledge of the principal constellations. All stars to the sixth magnitude are shown, this being about the limit of ordinary eyesight. A letterpress explanation is added to each map giving some account of the most interesting objects in each constellation. It is hoped that these little maps will be found useful as an introduction to larger atlases and more extensive works on the subject.

The numbers added to the smaller stars are those of Flamsteed. These numbers are universally recognised and quoted by astronomers.

The Milky Way has been omitted, as its insertion would tend to confuse the maps.

J. E. G.

June, 1891.

M677240

CONTENTS.

Map 1 . . . . . . The Brightest Stars, Northern Hemisphere.
,, 2 . . . . . . The Brightest Stars, Southern Hemisphere.
,, 3 . . . . . . "The Plough" (Ursa Major).
,, 4 . . . . . . The Little Bear and Pole Star (Ursa Minor).
,, 5 . . . . . . The Chair of Cassiopeia.
,, 6 . . . . . . Cepheus.
,, 7 . . . . . . Cygnus and Lyra.
,, 8 . . . . . . Aquila, Delphinus, and Sagitta.
,, 9 . . . . . . The "Square of Pegasus."
,, 10 . . . . . . Andromeda.
,, 11 . . . . . . Perseus.
,, 12 . . . . . . Auriga.
,, 13 . . . . . . Aries.
,, 14 . . . . . . The Hyades and Pleiades (Taurus).
,, 15 . . . . . . Gemini and Canis Minor.
,, 16 . . . . . . Orion.
,, 17 . . . . . . Canis Major and Lepus.
,, 18 . . . . . . The "Sickle" in Leo.
,, 19 . . . . . . Coma Berenices.
,, 20 . . . . . . Boötes.
,, 21 . . . . . . Corona Borealis.
,, 22 . . . . . . Hercules.
,, 23 . . . . . . Virgo.
,, 24 . . . . . . Serpens and Ophiuchus.
,, 25 . . . . . . Scorpio.
,, 26 . . . . . . Capricornus.
,, 27 . . . . . . Aquarius.
,, 28 . . . . . . Cetus.
,, 29 . . . . . . Corvus and Crater.
,, 30 . . . . . . The Southern Cross.

EXPLANATION OF SYMBOLS.

As the brighter Stars are known to Astronomers by the letters of the Greek alphabet, I give it here :—

The Greek Alphabet.

α	Alpha.
β	Beta.
γ	Gamma.
δ	Delta.
ϵ	Epsilon.
ζ	Zeta.
η	Eta.
θ	Theta.
ι	Iota.
κ	Kappa.
λ	Lambda.
μ	Mu.
ν	Nu.
ξ	Xi.
ο	Omicron.
π	Pi.
ρ	Rho.
σ	Sigma.
τ	Tau.
υ	Upsilon.
φ	Phi.
χ	Chi.
ψ	Psi.
ω	Omega.

Symbols used to represent the magnitudes of the Stars in the following Maps :—

✳	1st magnitude.
✦	2nd ,,
⅄	3rd ,,
+	4th ,,
●	5th ,,
·	6th ,,
⊙	Variable Star.
⁘	Star Cluster.

MAPS I. & II.

THE BRIGHTEST STARS IN THE NORTHERN AND SOUTHERN HEMISPHERES.

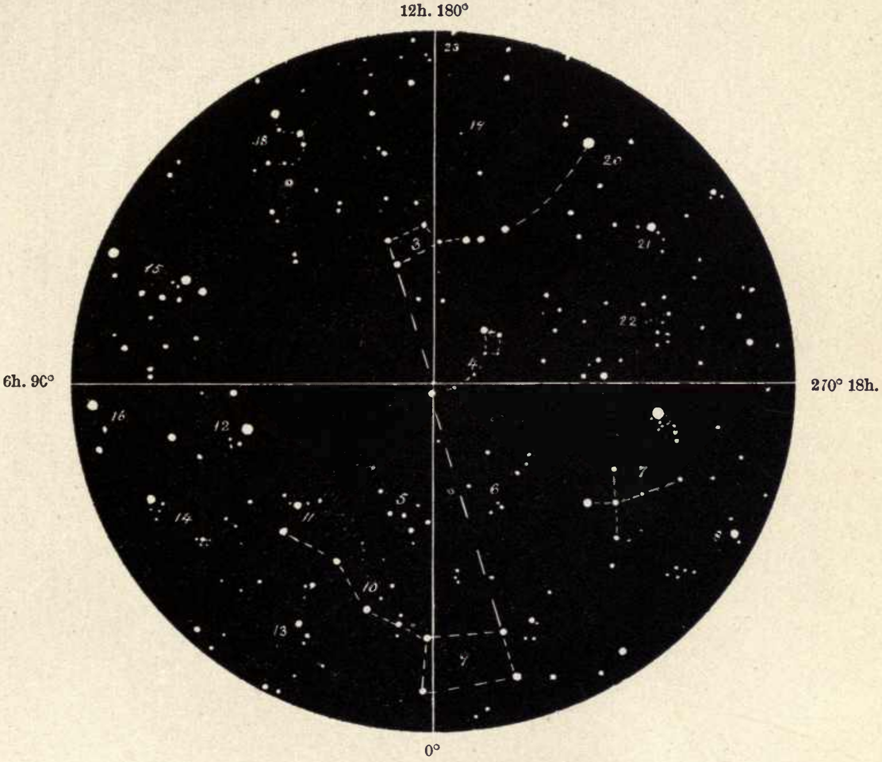
Maps I. & II.

THE BRIGHTEST STARS IN THE NORTHERN AND SOUTHERN HEMISPHERES.

These maps show—on an equal surface projection—the brightest stars in the Northern and Southern hemispheres, and will serve as a guide to the relative positions of the different constellations shown in the separate maps, which are referred to by numbers.

MAP I.

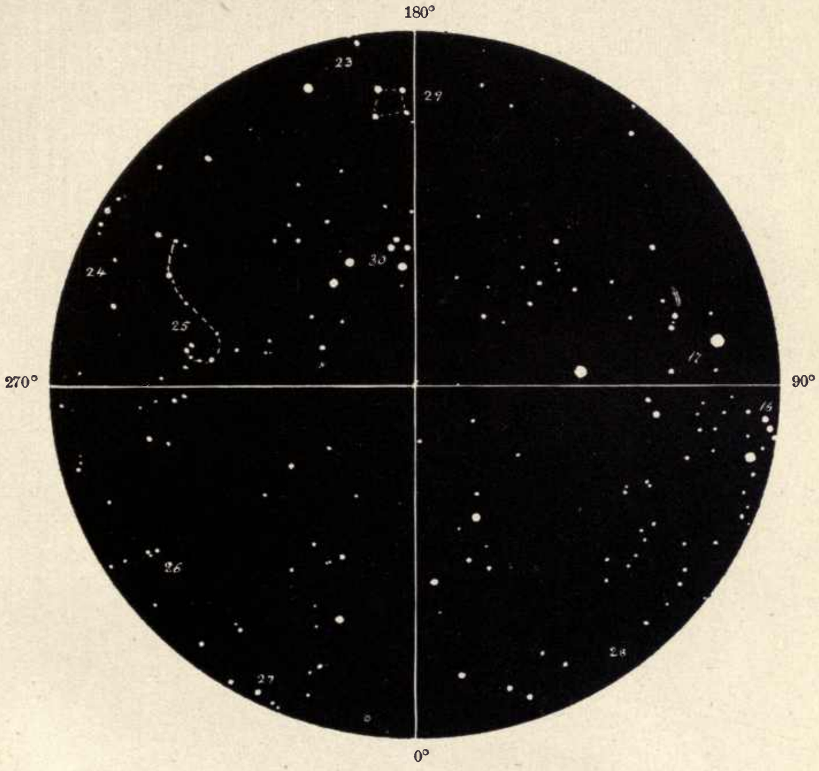
The Brightest Stars in the NORTHERN HEMISPHERE.


12h. 180°
23
19
18
20
3
21
15
22
6h. 90°
4
270° 18h.
16
12
7
6
5
11
14
8
10
13
9
0°

The numbers refer to the separate Maps.

MAP 2.

The Brightest Stars in the
SOUTHERN HEMISPHERE.


180°
23
29
24
30
25
270°
17
90°
18
26
27
28
0°

The numbers refer to the separate Maps.

MAP III.

THE PLOUGH (URSA MAJOR).

MAP III.

THE PLOUGH (URSA MAJOR).

This well-known group of seven bright stars is easily found, and as it never sets in Great Britain it is visible on *every* clear night. It is also sometimes called "Charles' Wain" and "the Dipper." The star δ is much fainter than the others, and may perhaps have diminished in brightness since ancient times. The stars α and β are called "the pointers," as they nearly point to the Pole Star.

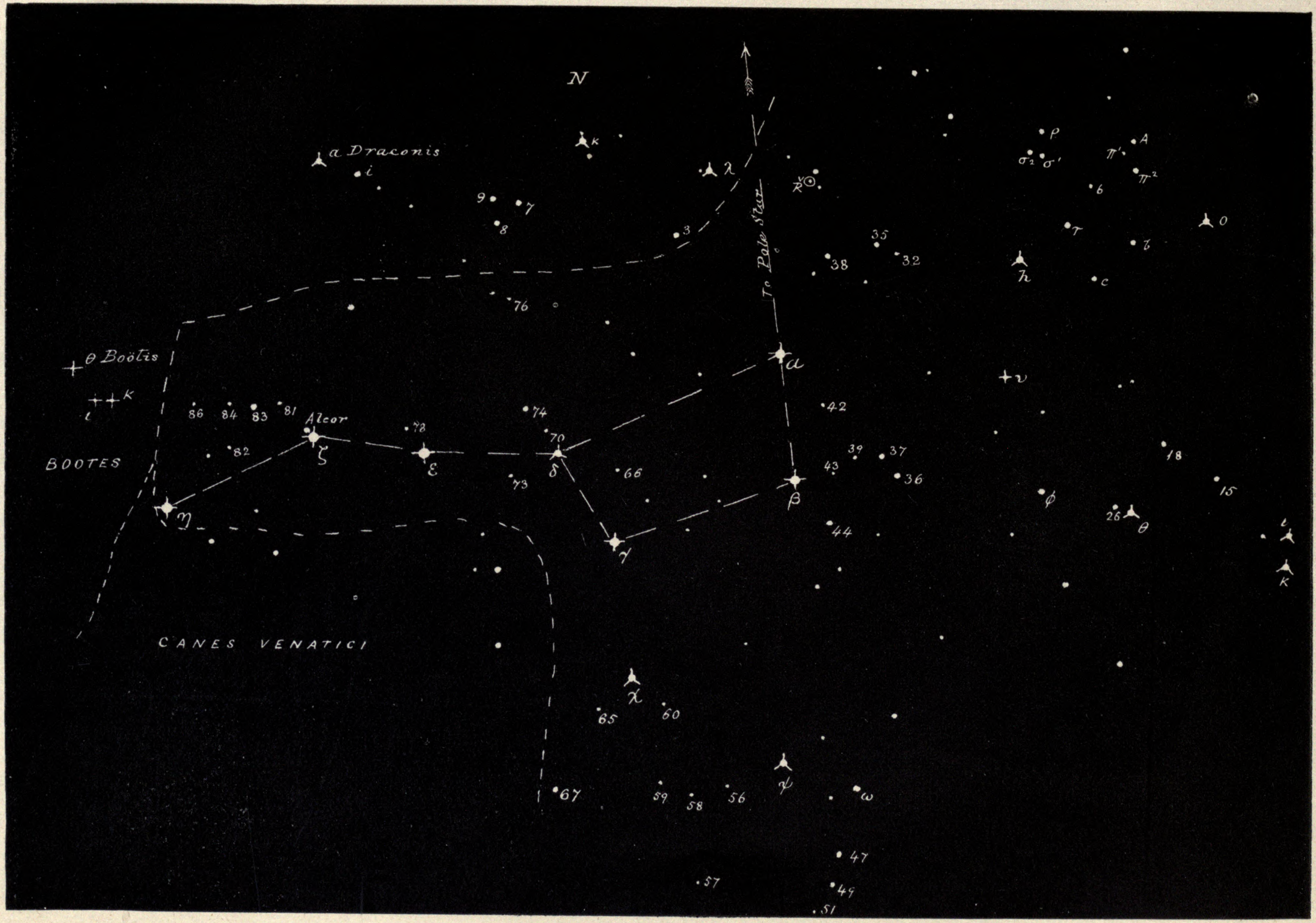
Near ζ is a small star known to the ancients as Alcor or "the test," as it was considered a test of keen vision, but it is now plain enough to good eyesight. ζ is double in a small telescope, the components being about 14 seconds of arc apart. Recent observations with the spectroscope have shown that the brighter component is again double, but so close that the largest telescope in existence could not divide it. These close components revolve round each other, thus forming a binary system.

The stars of the Plough will be found very useful for identifying some of the brighter stars. Thus, if the curve formed by the three stars, ϵ, ζ, η, is continued on it will pass near a very bright star. This is Arcturus (α Boötis, Map 20), one of the brightest stars visible in Europe. Again, if we draw an imaginary line from γ to β and produce it, it will pass near another bright star. This is Capella (α Aurigæ, Map 12). If we draw a line from δ to β and produce it, it will pass near the tolerably bright stars Castor and Pollux (α and β Geminorum, Map 15). Another line from δ to γ produced will pass near a bright star Regulus (α Leonis, Map 18). A line from β to η will pass near Corona Borealis (Map 21).

On the opposite side of the Pole Star from the Plough, a group of five conspicuous stars will be found forming a figure shaped like an irregular W. This is "Cassiopeia's Chair" (Map 5).

MAP 3.

THE "PLOUGH" (URSA MAJOR).


N
α Draconis
ι
κ
λ
To Pole Star
θ Boötis
κ
ι
BOOTES
CANES VENATICI
Alcor
ζ
ε
δ
γ
β
α
η
χ
ψ
ω
υ
φ
θ
h
τ
c
ρ
σ₂
σ¹
π¹
π²
A
ο
ι
κ
3
7
8
9
32
35
36
37
38
39
42
43
44
47
49
51
56
57
58
59
60
65
66
67
70
73
74
76
78
81
82
83
84
86
6
15
18
26

MAP IV.

THE LITTLE BEAR (URSA MINOR).

Map IV.

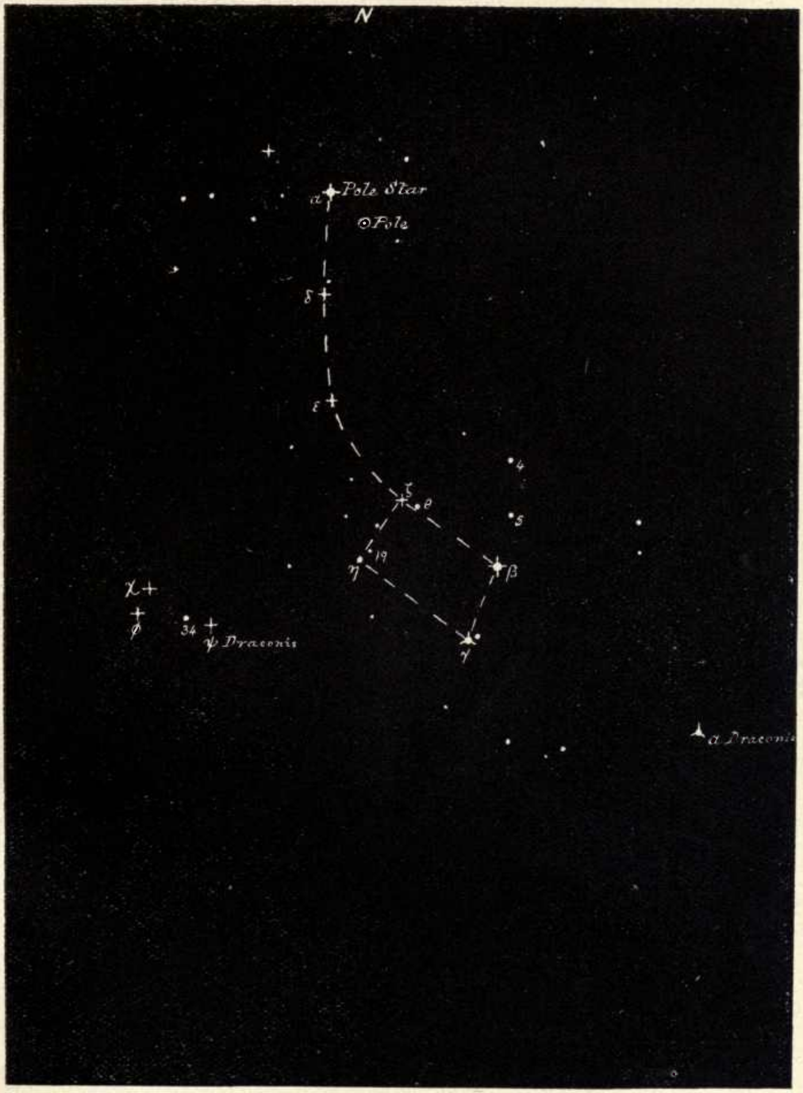
THE LITTLE BEAR (URSA MINOR).

This constellation consists of a figure of seven stars (or more correctly eight, as ζ has a small star near it, θ), somewhat resembling in outline the "Plough," with the exception that the "bear's tail" is curved in the opposite direction. The last star of the so-called "tail" is the Pole Star. Most of the stars of the Little Bear are, however, fainter than those of the Plough, but the Pole Star and β are of the second magnitude, and γ of the third. The others are of the fourth and fifth magnitude.

The Pole Star, which is a standard star of the second magnitude, is accompanied by a small companion at a distance of about 18 seconds of arc. It forms an excellent test for telescopes of 2 to 3 inches aperture. Observations of this pair seem to show that there is no physical connection between them, so that possibly the small star may be much farther from the eye than the bright one.

MAP 4.

THE LITTLE BEAR AND POLE STAR.


N
α Pole Star
Pole
δ
ε
ζ
θ
4
5
19
η
β
γ
χ
φ
34
ψ Draconis
α Draconis

MAP V.

THE CHAIR OF CASSIOPEIA.

MAP V.

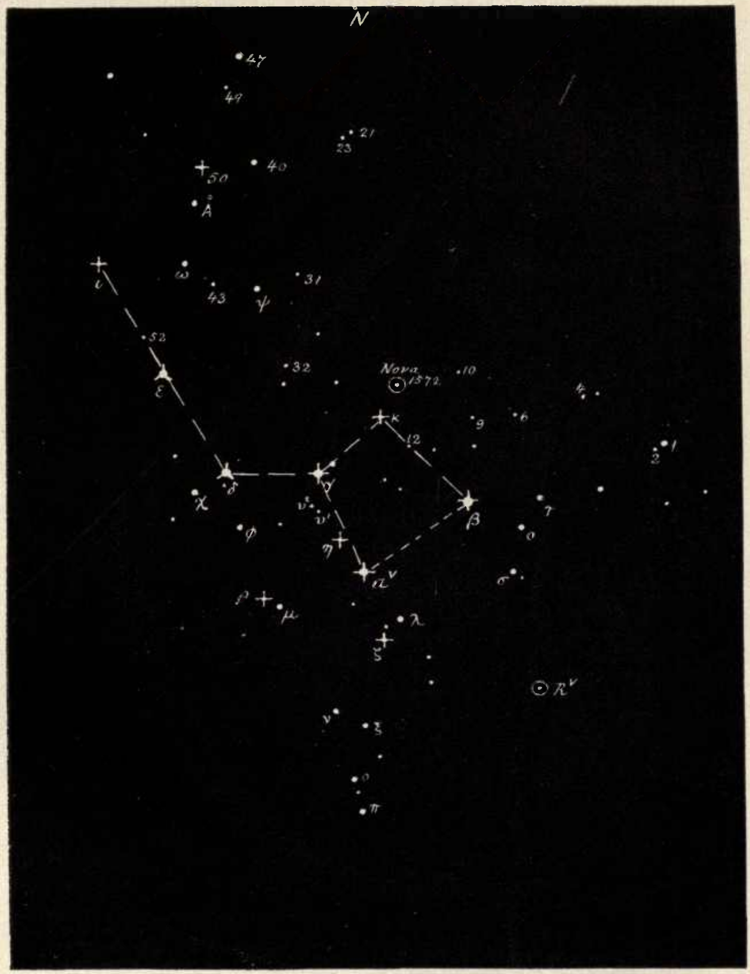
THE CHAIR OF CASSIOPEIA.

This well-known group of stars is situated on the opposite side of the Pole Star from the "Plough," and may be readily recognised by its five brighter stars, which form an irregular-shaped W. These are known to astronomers by the Greek letters β, α, γ, δ, ϵ, commencing with the most westerly of the five. α is slightly variable in light. North of β and γ is a fainter star, κ, which forms with β, α, and γ a trapezium. A little north preceding κ is the spot where Tycho Brahé's famous Temporary Star suddenly blazed out in November, 1572. η is a well-known binary, or revolving double, star; period about 176 years, according to Dunér.

Like the stars of the Plough, those of Cassiopeia's Chair may be used to find other stars. For instance, a line from β to γ nearly points to Capella (α Aurigæ, see Map 12.) A line from β to α passes close to γ Andromedæ (Map 10), and this line produced in the opposite direction passes a little north of the bright star Vega (Map 7). A line drawn from γ to α and produced will pass through the "Square of Pegasus" (Map 9).

MAP 5.

CHAIR OF CASSIOPEIA.



N
47
49
21
23
50
40
A
ι
ω
43
ψ
31
52
ε
32
Nova 1572
10
κ
12
9
6
4
1
2
δ
γ
χ
υ²
υ¹
β
7
o
φ
η
α
σ
ρ
μ
λ
ζ
R
ν
ξ
o
π

MAP VI.

CEPHEUS.

Map VI.

CEPHEUS.

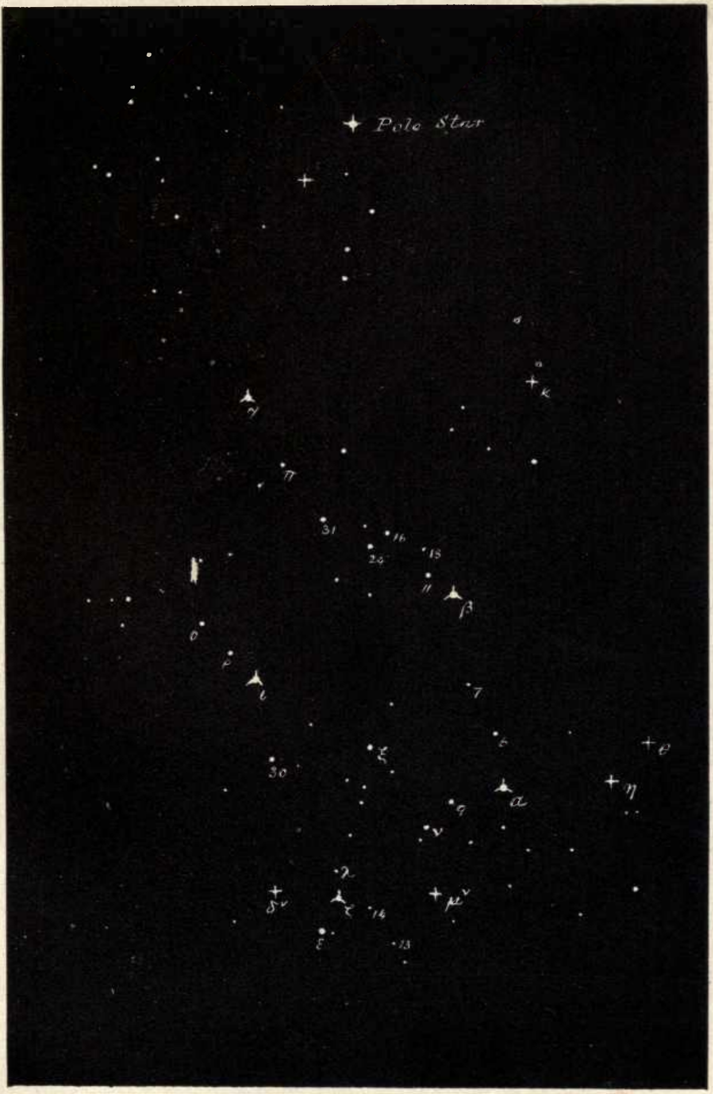
A constellation lying between Cassiopeia's Chair and Cygnus. Its southern portion is rich in naked-eye stars; and viewed with an opera glass there are some magnificent fields.

A well-marked triangle is formed by δ, ϵ, and ζ; of these δ is a remarkable variable star. It varies from magnitude 3·7 to 4·9, with a period of about 5 days 8 hours 47 minutes 40 seconds, from maximum to maximum. Its fluctuations of light may be well watched with an opera glass. In the telescope it is a wide double star, distance about 41 seconds.

A little north-west of ζ is μ, Sir William Herschel's "garnet star." This is perhaps the reddest star visible to the naked eye in the northern hemisphere. It is variable in light from 3·7 magnitude to 4·8, but with apparently no regular period, and it often remains for months together with scarcely any perceptible change. Numerous observations, however, in recent years by the present writer show it to be undoubtedly variable.

MAP 6.

CEPHEUS.


Pole Star
κ
γ
π
31
16
24
18
11
β
o
ρ
ι
7
6
θ
ξ
30
η
α
9
ν
λ
δ
ζ
14
μ
ε
13

MAP VII.

CYGNUS AND LYRA.

MAP VII.

CYGNUS AND LYRA.

CYGNUS, the Swan, is a well-known Northern Constellation. It may be best distinguished by the long cross formed by its principal stars, α, β, γ, δ, and ϵ; α or Deneb being the most northern and brightest, and β the most southern and faintest of the five. β is a well-known double star—one of the finest in the heavens. The colours of the components are yellow and blue. It may be well seen in a small telescope. δ is a close binary star. The small star numbered 61 is the nearest of all the stars in the *Northern* hemisphere, as far as we know at present. It is also a double star and suspected to be a binary. The star marked 34 was subject to great fluctuations of light in the year 1600 and subsequent years, when it was of the third magnitude, but for many years past it has not perceptibly varied, and is at present about fifth magnitude.

The star χ is a very remarkable and interesting variable. It varies from the fourth magnitude to below the thirteenth, with a period of about 406 days from maximum to maximum. This star will be due at another maximum towards the end of July, 1891.

Between γ and β Cygni the Milky Way is very bright, and north of α there is a very luminous spot.

LYRA, the Lyre, is a small but important constellation situated between Cygnus and Hercules (Map 22). It may easily be distinguished by its principal star Vega (α Lyræ), one of the brightest stars in the Northern hemisphere. This is a beautiful bluish-white star, and has a faint telescopic companion, which forms a good test object for small telescopes. A little to the east of Vega are situated two pairs of stars, ϵ_1 and ϵ_2, and ζ_1 and ζ_2. The former pair is one of the most interesting objects in the heavens. In any ordinary telescope (or even with an opera glass) ϵ appears as a wide double star. When a larger telescope and higher power is used each of the components is found to be a close double. Between these pairs are several fainter stars.

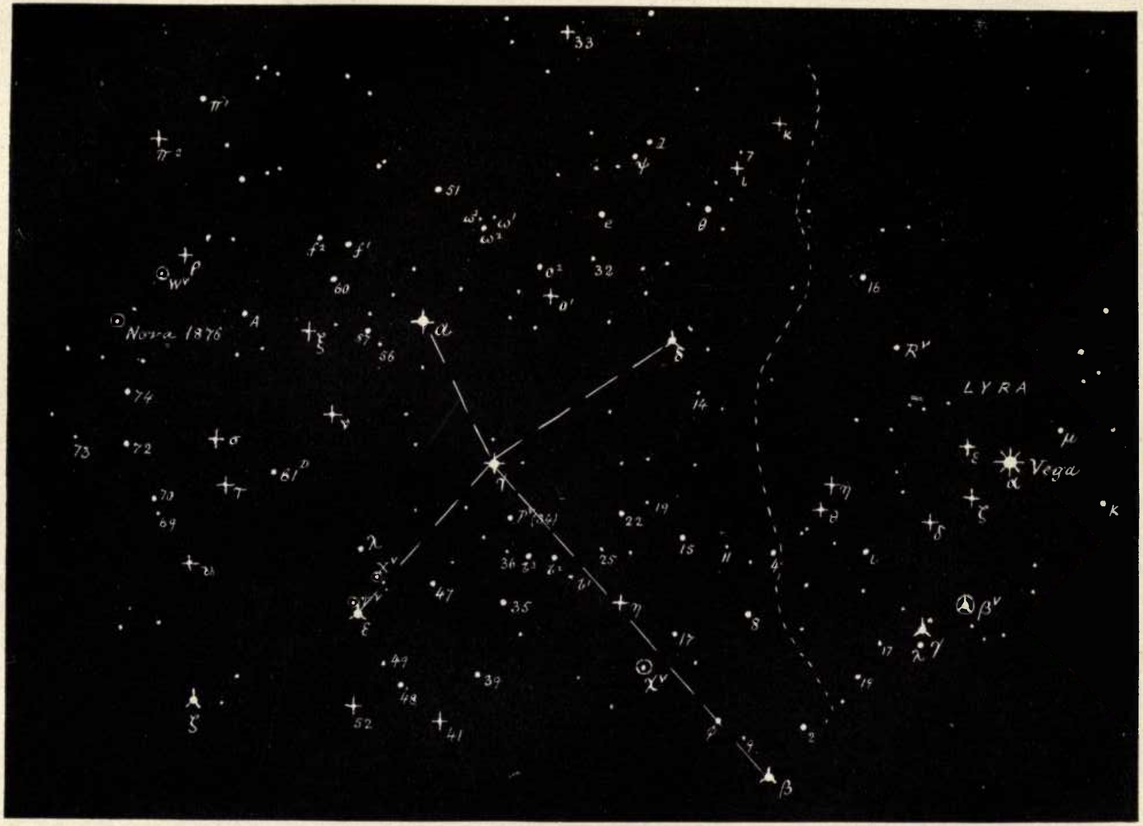
β is a well-known variable star, varying from magnitude 3·4 to 4·5, with a period of about 12 days 21 hours 47 minutes.

Between β and γ lies the remarkable annular nebula known as 57 Messier.

A line from Vega to Altair (α Aquilæ) will pass between β and γ Lyræ. (See Map 8.)

MAP 7.

CYGNUS AND LYRA.



LYRA
Vega
Nova 1876
α
β
γ
δ
ε
ζ
η
θ
ι
κ
λ
μ
ν
ξ
ο¹
ο²
π¹
π²
ρ
σ
τ
υ
φ
χ
ψ
ω¹
ω²
ω³
f¹
f²
A
R
W
61
33
51
32
16
14
22
25
35
36
39
41
47
48
49
52
56
57
60
69
70
72
73
74

MAP VIII.

AQUILA, DELPHINUS, AND SAGITTA.

MAP VIII.

AQUILA, DELPHINUS, AND SAGITTA.

Aquila, the Eagle, lies between Sagitta on the north and Sagittarius on the south. It is easily distinguished by its three stars, α, β, and γ, which are close together and nearly in a straight line. α, or Altair, is of the first magnitude, γ of the third, and β about 3·7. The star η is a variable of short period, varying from about 3·5 to 4·7, with a period of about 7 days 4 hours 14 minutes. The star λ Aquilæ, of about 3·3 magnitude, lies near the northern edge of a very luminous patch of Milky Way light. This spot includes several stars visible to the naked eye, and known as Sobieski's Shield.

Delphinus, the Dolphin. To the north-east of Altair lies "the Dolphin's rhomb"—a small trapezium of stars, very noticeable to the naked eye on a clear night. γ is a beautiful double star, and forms a fine object for a small telescope. I found the colours "reddish yellow and greyish lilac" in 1874.

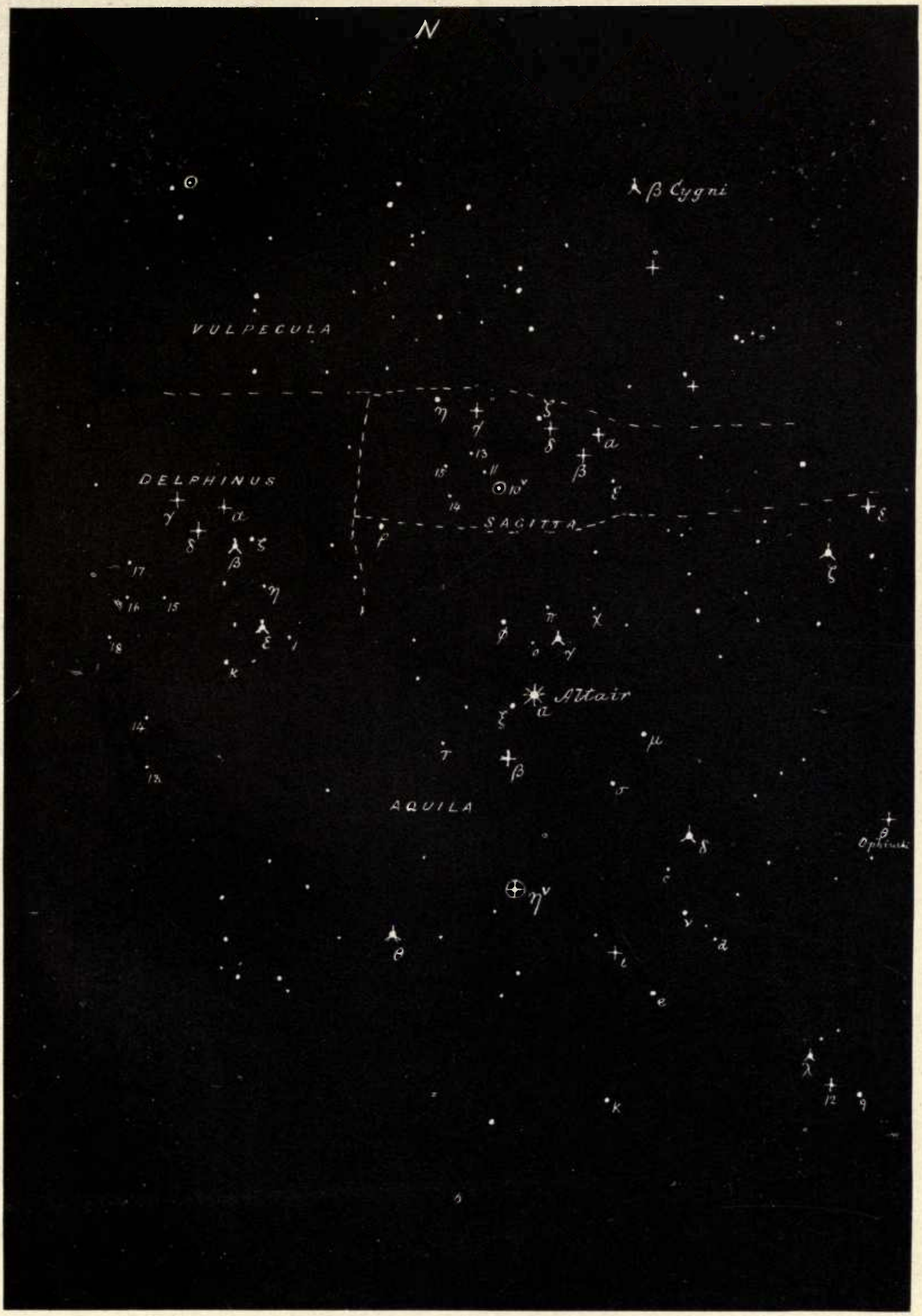
Sagitta, the Arrow, is a small constellation north of Aquila. ζ is a fine triple star, but the closer component can only be seen in large telescopes.

The star 10 Sagittæ is a short period variable discovered by the present writer in 1885. It varies from 5·6 magnitude to 6·4, with a period of 8 days 9 hours 11 minutes. It is visible to ordinary eyesight at maximum, and nearly invisible at minimum.

Between Sagitta and Cygnus lies Vulpecula, the Fox, a small constellation containing no very bright star.

MAP 8.

AQUILA, DELPHINUS, AND SAGITTA.


N
β Cygni
VULPECULA
DELPHINUS
γ
α
δ
β
ζ
η
ε
ι
κ
17
16
15
18
14
13
η
γ
ζ
δ
α
β
ε
13
11
15
10
14
SAGITTA
ρ
ε
ζ
π
χ
φ
ο
γ
Altair
α
ζ
μ
τ
β
σ
AQUILA
δ
θ
Ophiuchi
c
η
ν
d
θ
ι
e
λ
12
9
κ
5

MAP IX.

PEGASUS.

MAP IX.

PEGASUS.

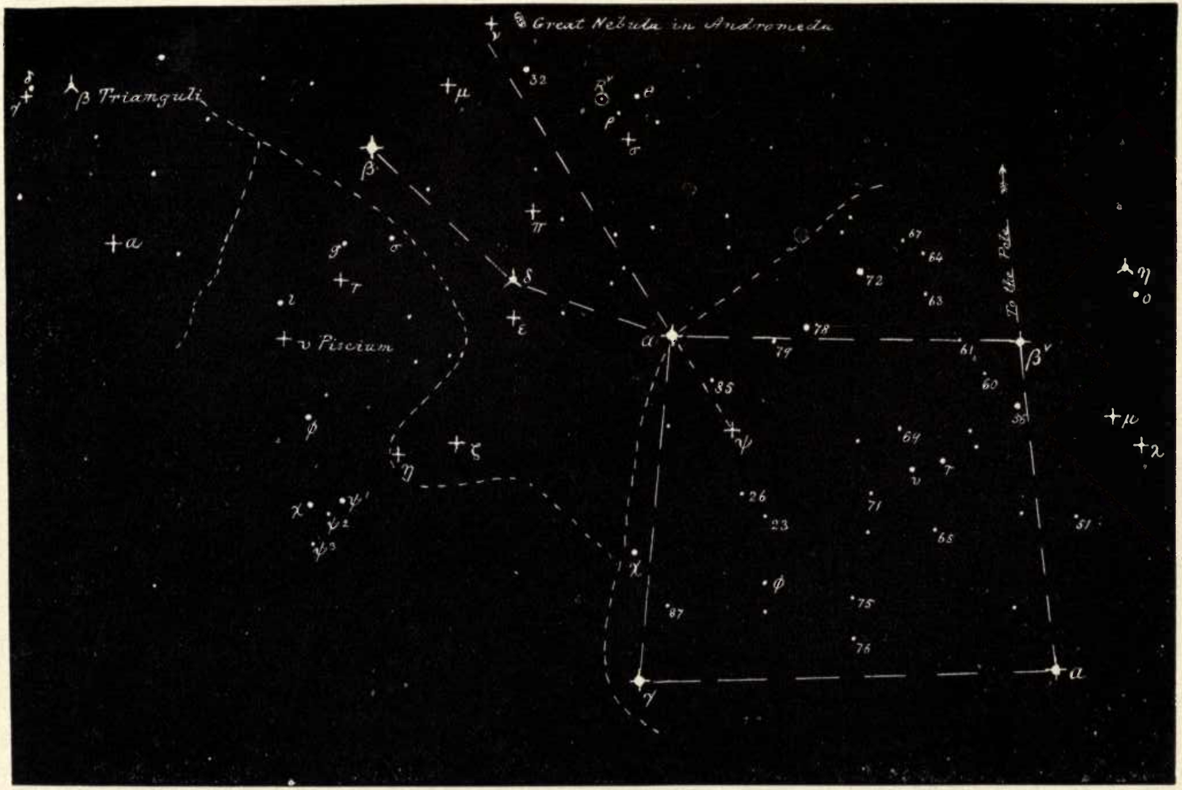
PEGASUS, or the Winged Horse, is one of the principal Northern constellations. It lies south of Andromeda, and north of Pisces and Aquarius (Map 27). Its principal stars, α, β, and γ, form with α Andromedæ (Alpherat) the well-known "Square of Pegasus." This square forms with β and γ Andromedæ and β Persei (Algol) a figure very much resembling in its outline the Plough in Ursa Major, but of course covering a considerably larger area of the heavens. It is worth remarking that the stars in this figure corresponding to the "pointers" in the Plough, namely α and β Pegasi, also point nearly to the Pole Star. β Pegasi is slightly variable in light.

A line from ψ Pegasi to α Andromedæ nearly points to ν Andromedæ. Near this latter star is the "great nebula in Andromeda," one of the finest in the heavens, and visible to the naked eye. It is a magnificent object in a good telescope, and is conspicuous enough with a binocular field glass.

MAP 9.

THE "SQUARE OF PEGASUS."

N


Great Nebula in Andromeda
β Trianguli
To the Pole
υ Piscium
α
β
γ
δ
ε
ζ
η
μ
ν
π
ρ
σ
τ
υ
φ
χ
ψ
32
35
51
55
60
61
63
64
65
67
71
72
75
76
78
79
85
87
23
26

MAP X.

ANDROMEDA.

MAP X.

ANDROMEDA.

This constellation is situated between Cassiopeia on the north, and Pegasus and Pisces on the south. The principal stars are α (Alpherat) which forms the north-east corner of the "Square of Pegasus" (Map 9), β and γ, stars of the second magnitude; δ of the third magnitude; o and μ about the fourth, and others fainter.

The stars β and γ form with β Persei (Algol) and the "Square of Pegasus" (Map 9) a figure very much resembling the "Plough," but of course on a much larger scale.

The stars α and β Persei, γ and β Andromedæ, and β Trianguli, form a W-shaped figure as shown in the map.

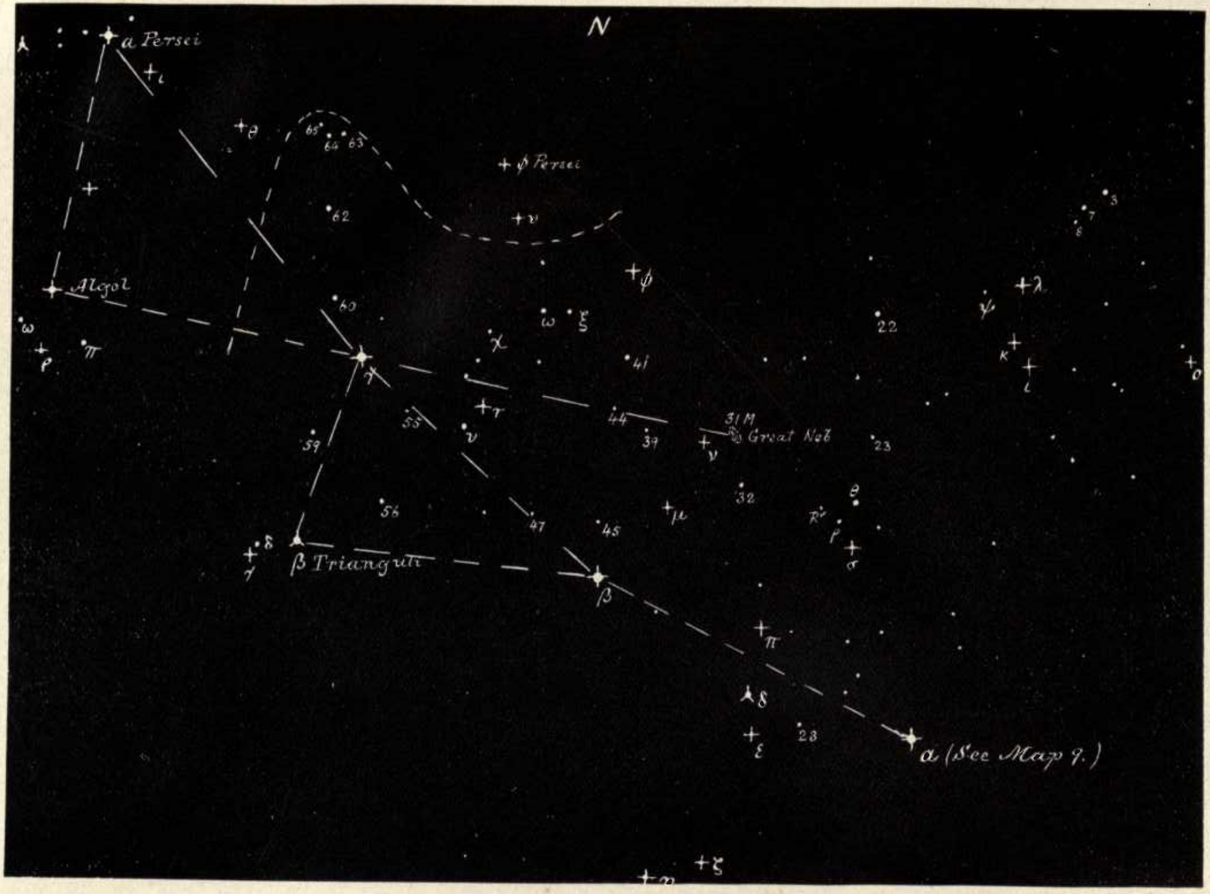
γ is a triple star, but in ordinary telescopes appears only double. The colours of the components are "yellow and sea-green."

Near the star ν is situated the "great nebula in Andromeda," one of the finest objects in the heavens. It is visible to the naked eye, and may be well seen with a small telescope. Even in a good opera glass it is a conspicuous object.

Near θ and ρ is a remarkable variable star, R Andromedæ. It varies from about 5½ magnitude to below 12, with a period of about 411 days. A maximum of this star will be due about October 25th, 1891, and with the period given, the dates of subsequent maxima may be easily found.

MAP 10.

ANDROMEDA.


N
α Persei
Algol
φ Persei
31 M
Great Neb
β Triang uli
β
α (See Map 9.)
65
64
63
62
60
59
56
55
47
45
44
41
39
32
23
22
28
8
7
3

MAP XI.

PERSEUS.

MAP XI.

PERSEUS.

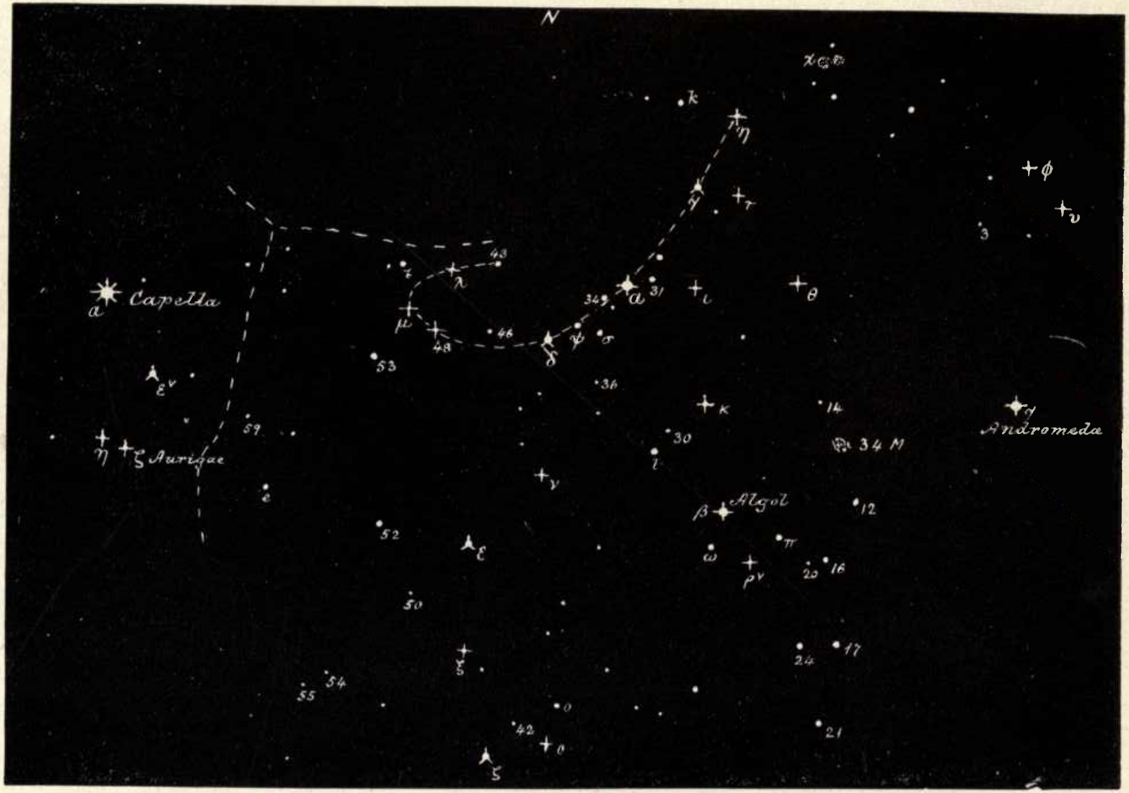
To the south-east of Cassiopeia's Chair lies the constellation Perseus, distinguished by its well-known festoon of stars shown in the accompanying map. Its brightest star, *α*, is about the second magnitude. About ten degrees south of this is the famous variable star Algol, or *β* Persei. It is stated in several books on astronomy that Algol varies from the second to the fourth magnitude, but this is incorrect. The variation is not so great. My own observations show that it does not much exceed one magnitude, and this is confirmed by photometric measures made by Professor Pickering at Harvard Observatory (U.S.A.)

In the northern portion of the constellation, near *χ*, is a fine double cluster, which may be seen with an opera glass, but of course a good telescope is necessary to see it to advantage.

A little north, preceding Algol, is the cluster 34 Messier, which may be well seen with a small telescope. I have seen stars sparkling in it with a binocular.

MAP 11.

PERSEUS.


N
χ
k
η
γ
τ
φ
υ
3
43
λ
μ
48
46
δ
ψ
σ
349
α
31
ι
θ
α Capella
ε
53
36
κ
14
γ Andromeda
59
η
ζ Aurigae
30
l
34 M
ν
e
β Algol
12
52
ε
ω
π
ρ
20
16
50
24
17
ξ
54
55
o
42
o
ζ
21

MAP XII.

AURIGA.

Map XII.

AURIGA.

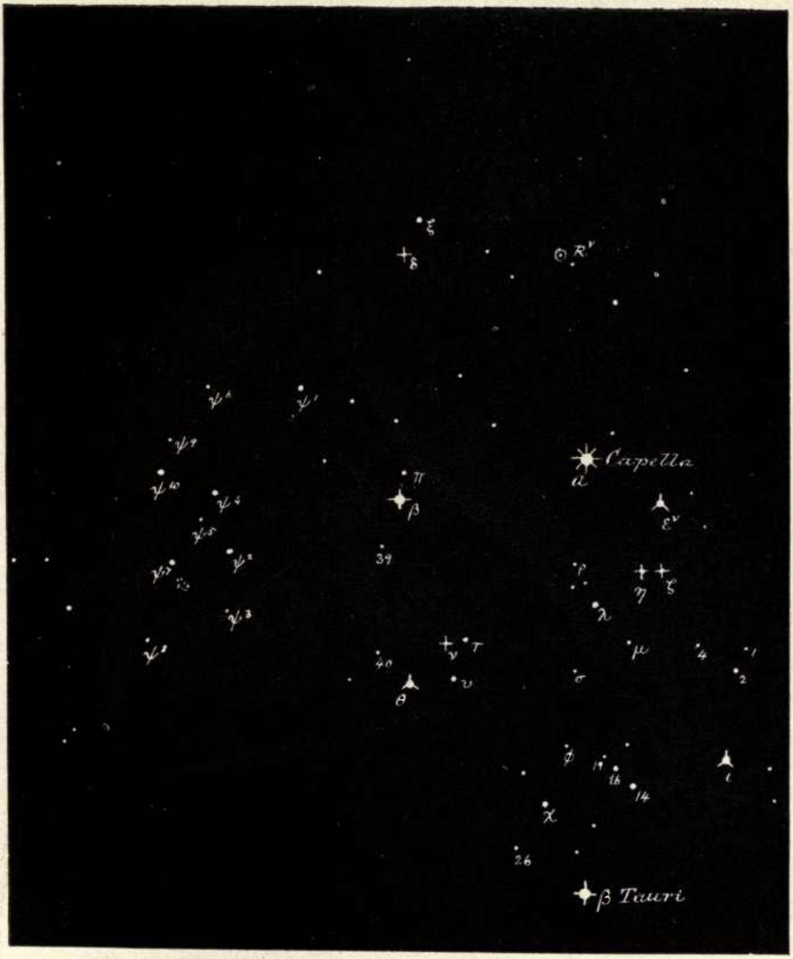
Auriga, the Charioteer, lies south-east of Perseus, and between that constellation and Gemini (Map 15). Its principal star is the brilliant Capella, one of the brightest stars in the Northern hemisphere.

A line from Capella to β Tauri will pass through Orion's "Belt" (Map 16), and a line from Capella to ι Aurigæ will point to Aldebaran in the Hyades (Map 14).

The star ϵ is variable to a small extent. South of η and θ there are several fine clusters. The star β has recently been discovered by the spectroscope to be a very close double, too close to be seen by any telescope yet constructed. The observations indicate a period of revolution of about eight days, with an orbit of 16 millions of miles in diameter. This would imply that the mass of this star is a little greater than that of the Sun.

MAP 12.

AURIGA.


ξ
δ
R^{v}
ψ^{6}
ψ^{1}
ψ^{9}
ψ^{10}
ψ^{4}
ψ^{5}
ψ^{7}
ψ^{2}
ψ^{3}
ψ^{8}
π
β
Capella
α
ε^{v}
39
ρ
η
ζ
λ
μ
4
1
2
ν
τ
40
θ
υ
σ
φ
19
16
14
ι
χ
26
β Tauri

MAP XIII.

ARIES.

Map XIII.

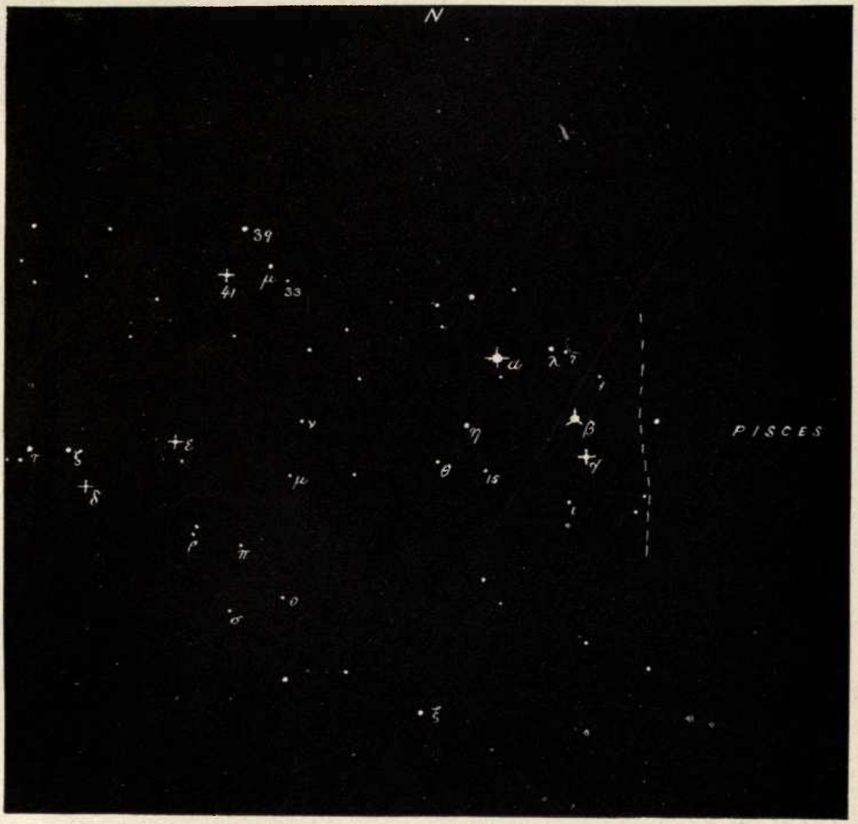
ARIES.

Aries, the Ram, is the first sign of the Zodiac, or that in which the Vernal Equinoctial point was situated in the time of Hipparchus. Owing, however, to the precession of the equinoxes this point has now retrograded into Pisces, and will continue to retrograde until it has completed its course through all the signs of the Zodiac back again into Aries. This period is, however, so immensely long—about 25,800 years—that the term "the first point of Aries" is retained, and small annual corrections are applied to the right ascensions and declinations of the stars to correct their positions with reference to this moving point.

Aries lies between Pisces and Triangulum on the north and Cetus on the south. It contains but few bright stars, the brightest being α (Hamal) of the second magnitude, β of the third, 41 of magnitude $3\frac{1}{2}$, and γ of the fourth. γ is a fine double star and may be well seen with a small telescope. It is remarkable as the first double star discovered with the telescope—by Hooke in 1664.

MAP 13.

ARIES.


N
39
41
μ
33
α
λ
β
γ
η
θ
15
ν
τ
ζ
ε
δ
μ
ρ
π
σ
ο
ξ
PISCES

MAP XIV.

THE HYADES AND PLEIADES (TAURUS).

MAP XIV.

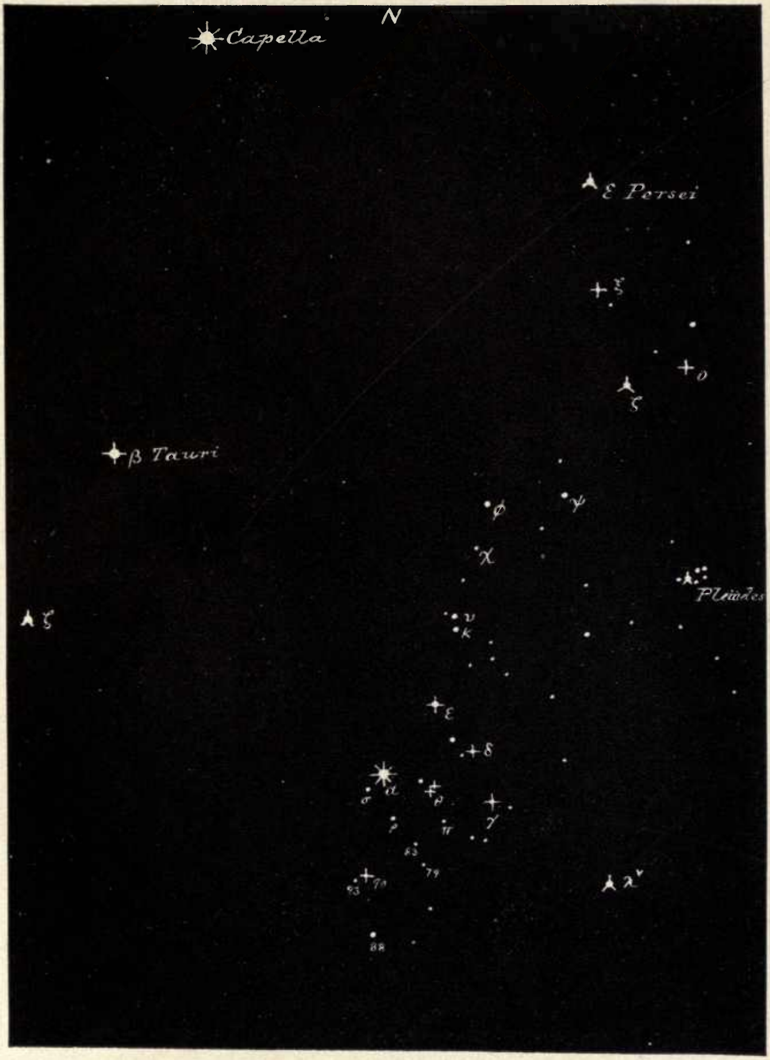
THE HYADES AND PLEIADES (TAURUS).

These well-known groups are situated in the constellation Taurus, or the Bull, one of the signs of the Zodiac. The Hyades form a V-shaped figure and contain the reddish star Aldebaran, a star of the first magnitude. To the north-west of the Hyades is the famous group the Pleiades, perhaps the most remarkable group of stars in the heavens. To ordinary eyesight it consists of six stars. Some persons gifted with exceptionally keen eyesight have, however, seen eleven or twelve. With an opera glass many more are visible, and with a large telescope several hundreds may be counted. On a photograph taken at the Paris Observatory, with an exposure of three hours, no less than 2,326 are distinctly visible. The group includes a mass of nebulous light visible on the photograph.

The star λ Tauri is a variable of the type of Algol. It varies from 3·4 to 4·2 magnitude, with a mean period of about 3 days 22 hours 52 minutes 12 seconds, but with some irregularities.

MAP 14.

THE HYADES AND PLEIADES.


N
Capella
ε Persei
ξ
o
ζ
β Tauri
ψ
φ
χ
Pleiades
ζ
υ
κ
ε
δ
α
σ
θ
γ
ρ
π
83
79
70
93
λ
88

MAP XV.

GEMINI AND CANIS MINOR.

MAP XV.

GEMINI AND CANIS MINOR.

GEMINI, the Twins, is one of the constellations of the Zodiac, lying south of Auriga and east of Taurus. Its most conspicuous stars are Castor (α) and Pollux (β). Pollux is slightly brighter than Castor. Castor is a well-known binary star, the period of revolution being about 1,000 years. The components, which are nearly equal in brightness, may be well seen in a small telescope. A good 2-inch aperture will show them.

ζ is a variable star, varying from 3·7 to 4·5, with a period of about 10 days 3 hours 41 minutes. η is also variable to some extent.

The straight line formed by μ, ν, γ, and ξ will be noticed. This line points nearly to Capella. A line from Castor to υ (near Pollux) will pass near Procyon (α Canis Minoris).

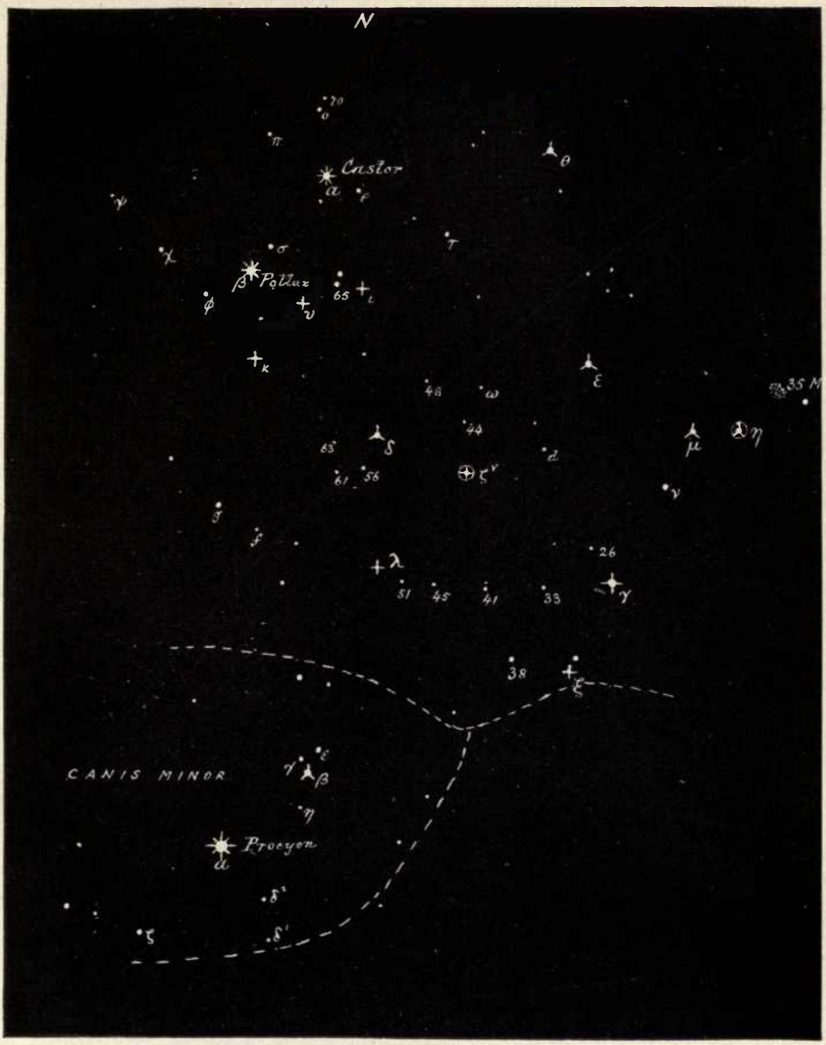
A little north of η is a fine cluster, known as 35 Messier. It is just visible to the naked eye, and is a fine object even with a small telescope.

CANIS MINOR, or the Little Dog, lies south of Gemini. It is a very small constellation and is chiefly remarkable for containing the bright star Procyon, one of the brightest stars in the Northern hemisphere.

Procyon, Betelgeuse (α Orionis) and Sirius form a fine equilateral triangle, which is very noticeable near the meridian—in the early part of the evenings—in the beginning of March.

MAP 15.

GEMINI AND CANIS MINOR.


N
70
o
π
Castor
α
ρ
θ
ψ
χ
σ
τ
β
Pollux
65
ι
φ
υ
κ
ε
48
ω
35 M
44
μ
η
63
δ
d
61
56
ζ
ν
g
f
26
λ
51
45
41
33
γ
38
ξ
ε
CANIS MINOR
γ
β
η
Procyon
α
δ²
ζ
δ¹

LIBRARY
OF THE
ASTRONOMICAL SOCIETY
OF THE PACIFIC

MAP XVI.

ORION.

MAP XVI.

ORION.

This splendid constellation is perhaps the finest group of stars in the heavens, and lying as it does near the celestial equator, it is very conspicuous in both hemispheres. It lies south of Taurus and Gemini, but requires no particular alignment to find it, as the figure formed by its brightest stars is well known, and may be easily distinguished by the number of brilliant stars it contains.

A remarkable quadrilateral is formed by the four stars α (Betelgeuse), γ, β (Rigel), and κ. Of these α and β are of the first magnitude, γ of the second, and κ about 2½. In the middle of this quadrilateral are three bright stars, δ, ϵ, and ζ, of the second magnitude, nearly in a straight line, forming "Orion's belt." South of these are three fainter stars, also in a straight line, forming the "sword." Surrounding θ, the central star of the "sword," is the "great nebula in Orion," one of the finest objects in the heavens, and visible with a small telescope.

Rigel is a well-known double star, but the companion is rather faint. α and δ are slightly variable in light. α is a very reddish star.

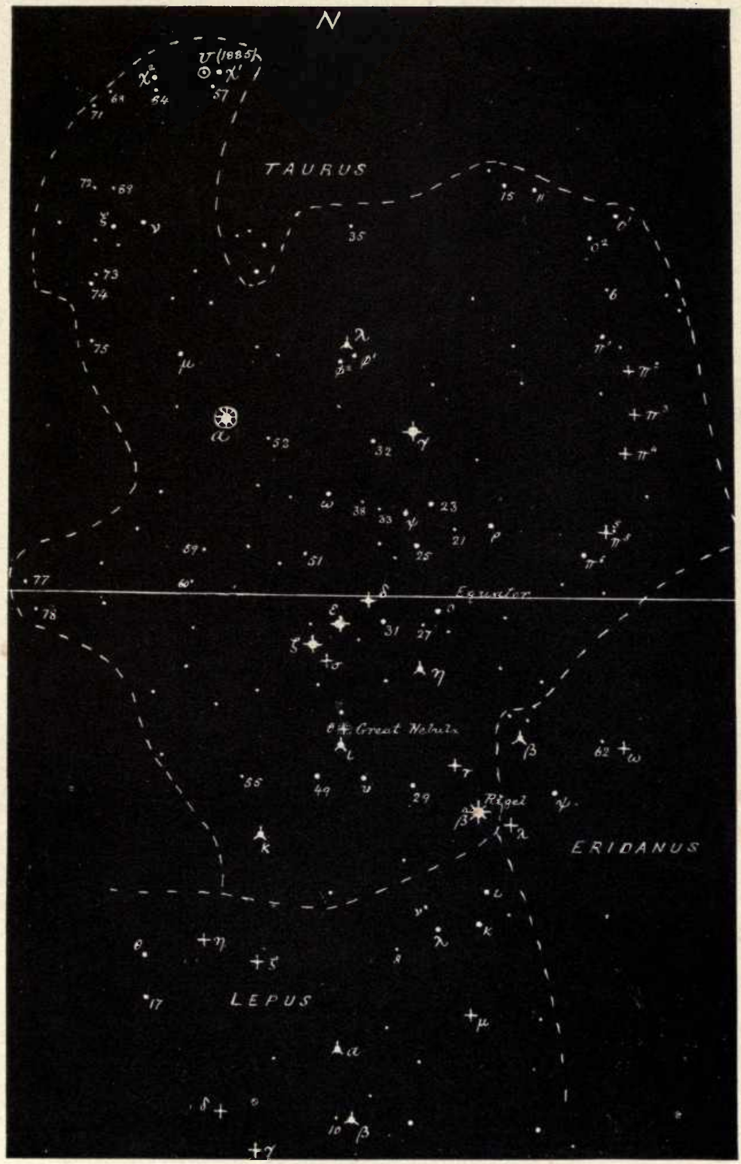
This constellation is rich in interesting telescopic objects, an account of which will be found in Webb's "Celestial Objects," and other books.

Near χ^1 in the northern portion of the constellation lies U Orionis, the so-called "Nova" of 1885, discovered by the present writer on the evening of December 13th of that year. It is now known to be a long period variable, varying from the sixth to below the twelfth magnitude, with a period of about 373 days. It is a very reddish star, with a fine spectrum.

The three stars in "Orion's belt" point nearly to Sirius (α Canis Majoris).

MAP 16.

ORION.


N
U (1885)
χ²
χ¹
64
57
69
71
TAURUS
72
69
ξ
ν
73
74
75
μ
35
15
11
o¹
o²
6
λ
φ²
φ¹
π¹
π²
π³
π⁴
α
53
32
γ
23
ω
38
33
ψ
21
ρ
π⁵
π⁶
59
51
25
77
60
δ
Equator
78
ε
31
27
ζ
σ
η
θ
Great Nebula
ι
β
62
ω
τ
56
49
υ
29
Rigel
β
ψ
λ
κ
ERIDANUS
ι
ν
κ
λ
θ
η
ζ
17
LEPUS
μ
α
δ
10
β
γ

MAP XVII.

CANIS MAJOR AND LEPUS.

MAP XVII.

CANIS MAJOR AND LEPUS.

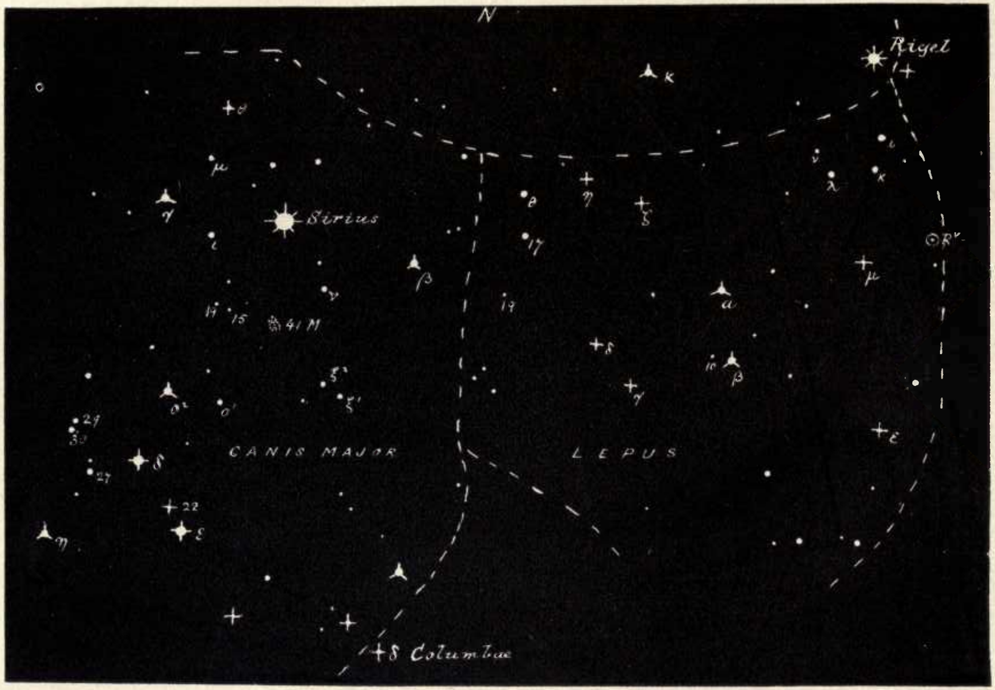
CANIS MAJOR, or the Great Dog, is a constellation lying south-east of Orion, and is chiefly remarkable for containing Sirius, the "dog star," the brightest star in the heavens. Owing to its great brilliancy it has been called the "monarch of the skies," but in reality it is probably smaller in size than many fainter stars, its apparent brightness being due to its comparative proximity to the earth. Sirius is a well-known binary star. The companion, which is only of the tenth magnitude, was discovered in 1862 by Alvan Clark, the famous American optician. Since that year it has been carefully measured, and the period of revolution determined. An orbit recently computed by the present writer makes the period about 58½ years. The companion is at present (1891) so near its brilliant primary that it is beyond the reach of even the largest telescopes.

About 4 degrees south of Sirius is a large cluster of stars, 41 of Messier's list, which is just visible to the naked eye.

The three stars in "Orion's belt" nearly point to Sirius.

MAP 17.

CANIS MAJOR AND LEPUS.



N
Rigel
Sirius
CANIS MAJOR
LEPUS
δ Columbae
41 M
R^v
κ
α
β
γ
δ
ε
ζ
η
θ
ι
κ
λ
μ
ν
ξ¹
ξ²
ο¹
ο²
17
19
15
22
27
29
30

MAP XVIII.

LEO.

MAP XVIII.

LEO.

Leo, the Lion, is one of the constellations of the Zodiac, and may be distinguished by the well-known "Sickle," the bright star Regulus being at the extremity of the handle.

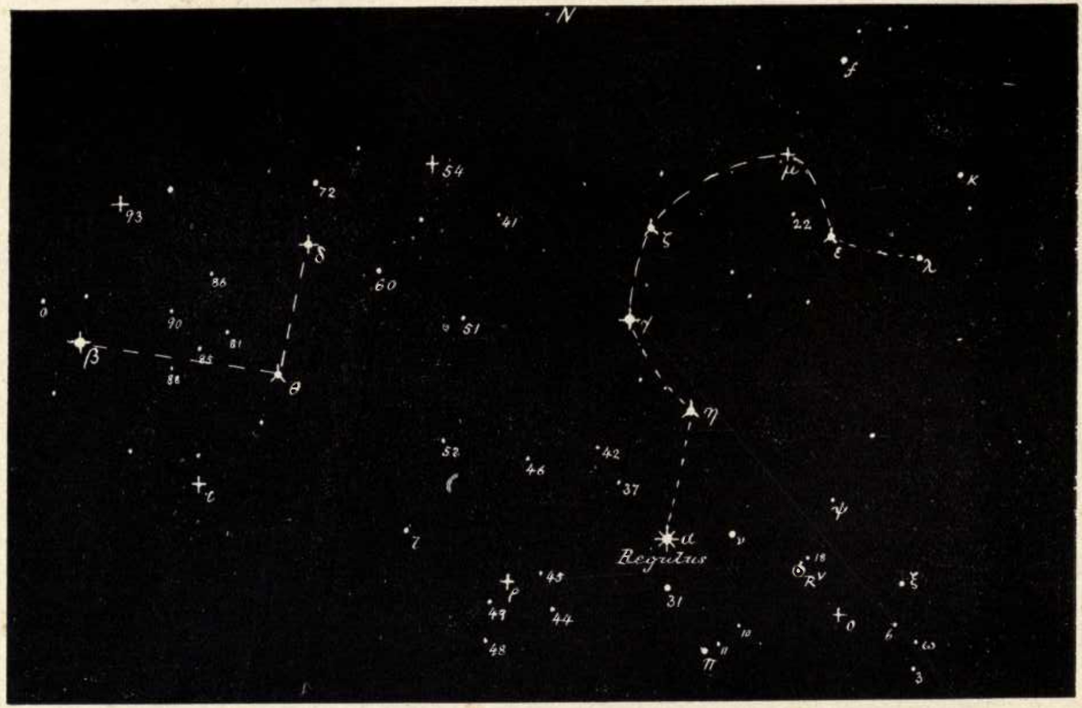
It lies between Cancer and Virgo (Map 23), and forms a conspicuous group during the spring nights in England.

γ is a well-known binary star, and has close to it a star of the sixth magnitude. β (Denebola), δ, and θ form nearly a right-angled triangle, θ being at the right angle. The small star marked R is a remarkable variable of long period. It varies from about 5½ magnitude to 10th magnitude, with a period of about 313 days.

The "Sickle" is also remarkable as containing the "radiant point" of the November meteor system (1866), or the point from which the meteors seem to radiate. The position of this point is a little south-west of ζ.

MAP 18.

THE "SICKLE" IN LEO.


N
f
κ
μ
22
ε
λ
ζ
γ
η
54
72
93
41
δ
86
60
0
90
51
81
β
85
88
θ
52
42
46
37
ι
ψ
7
α
Regulus
ν
18
R
45
ξ
ρ
31
49
44
ο
b
10
ω
48
11
π
3

MAP XIX.

COMA BERENICES.

MAP XIX.

COMA BERENICES.

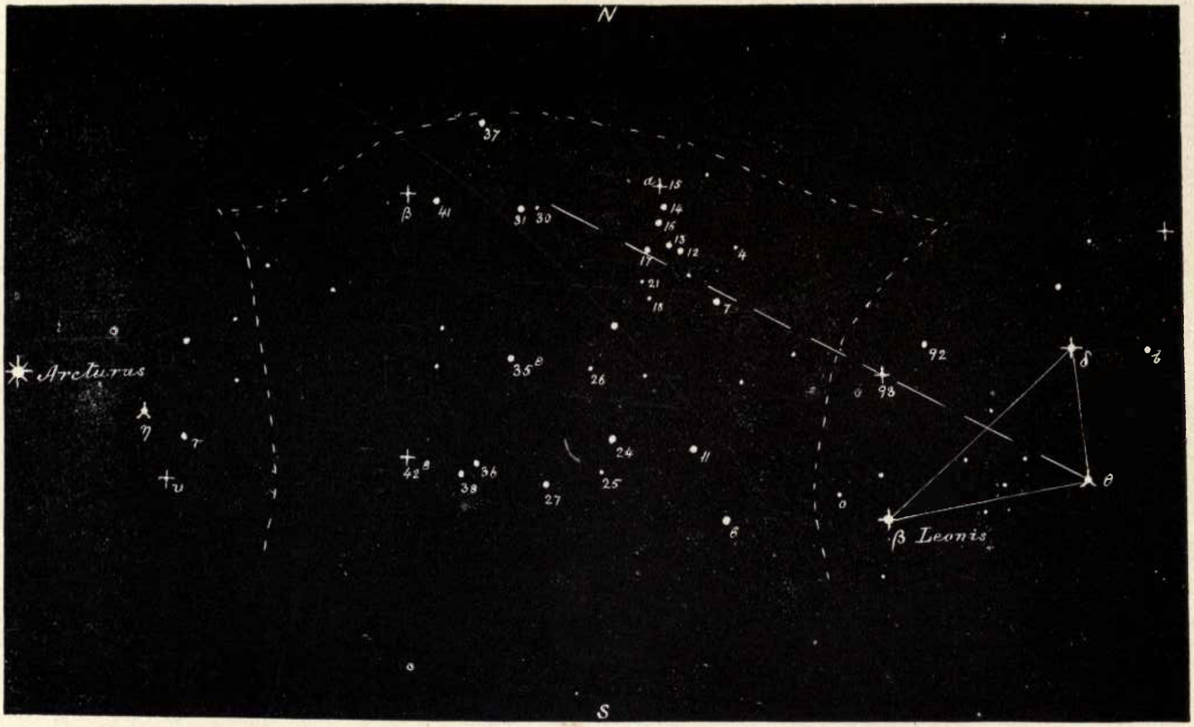
This group of small stars lies to the east of Leo (Map 18) and north of Virgo (Map 23). The brightest star of the constellation is β, but the brightest star of the cluster is γ about $4\frac{1}{2}$ magnitude.

The star α (42) is a remarkable binary, the period of revolution being only $25\frac{3}{4}$ years. 35 is also a binary, but with a much longer period.

The North Pole of the Milky Way lies in this constellation near the star numbered 31.

MAP 19.

COMA BERENICES.


N
S
37
β
41
31
30
α
15
14
16
13
12
17
4
21
18
7
92
δ
b
98
Arcturus
35
26
η
τ
24
11
υ
42
36
38
27
25
θ
6
β Leonis

MAP XX.

BOÖTES.

MAP XX.

BOÖTES.

This is a well-known constellation, as it contains Arcturus, one of the brightest stars in the Northern hemisphere. If recent measures of its distance are to be relied upon, this star lies at a vast distance from the earth, about 25 times the distance of 61 Cygni, a star of only the fifth magnitude. Judging from its brilliancy, therefore, Arcturus must be a sun of gigantic size.

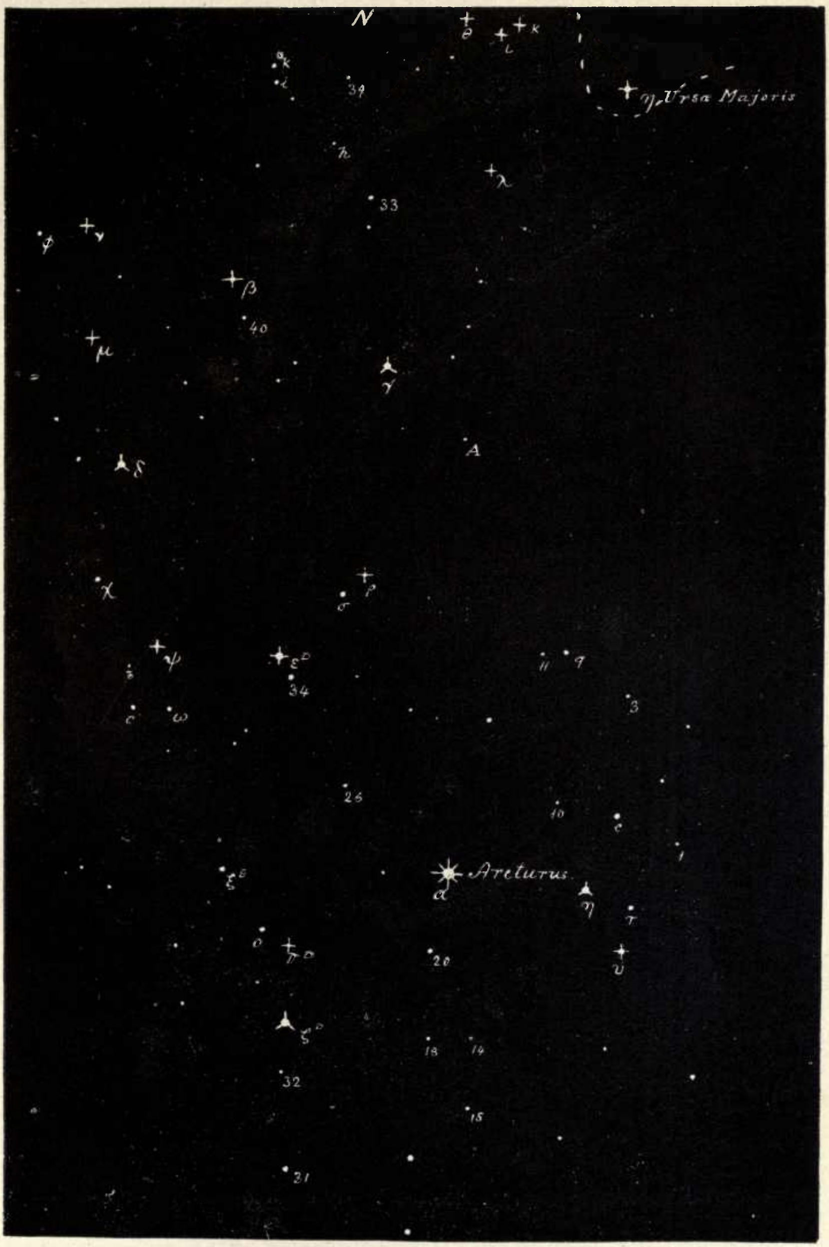
The other principal stars of Boötes are ϵ of magnitude $2\frac{1}{2}$, η and γ of the 3rd, δ and β about $3\frac{1}{2}$, and ζ, θ, and υ of the 4th magnitude.

ϵ is a fine double star, remarkable for the beauty of the colours displayed by its components, yellow and blue.

ξ is another beautiful pair, and is also a binary, or revolving double, star.

MAP 20.

BOÖTES.


N
θ
ι
κ
η Ursa Majoris
k
i
39
h
λ
33
φ
ν
β
40
μ
γ
A
δ
χ
ρ
σ
ψ
ε
34
11
9
3
c
ω
26
10
e
f
ξ
Arcturus
α
η
τ
o
π
20
υ
ζ
18
14
32
15
31

MAP XXI.

CORONA BOREALIS.

MAP XXI.

CORONA BOREALIS.

CORONA BOREALIS, or the Northern Crown, is a small but conspicuous constellation situated between Boötes and Hercules. A line from Vega to Arcturus will pass a little north of the group. The principal stars form a segment of a circle, the brightest being α, or Alphecca, the "gem of the coronet," a star of about the second magnitude.

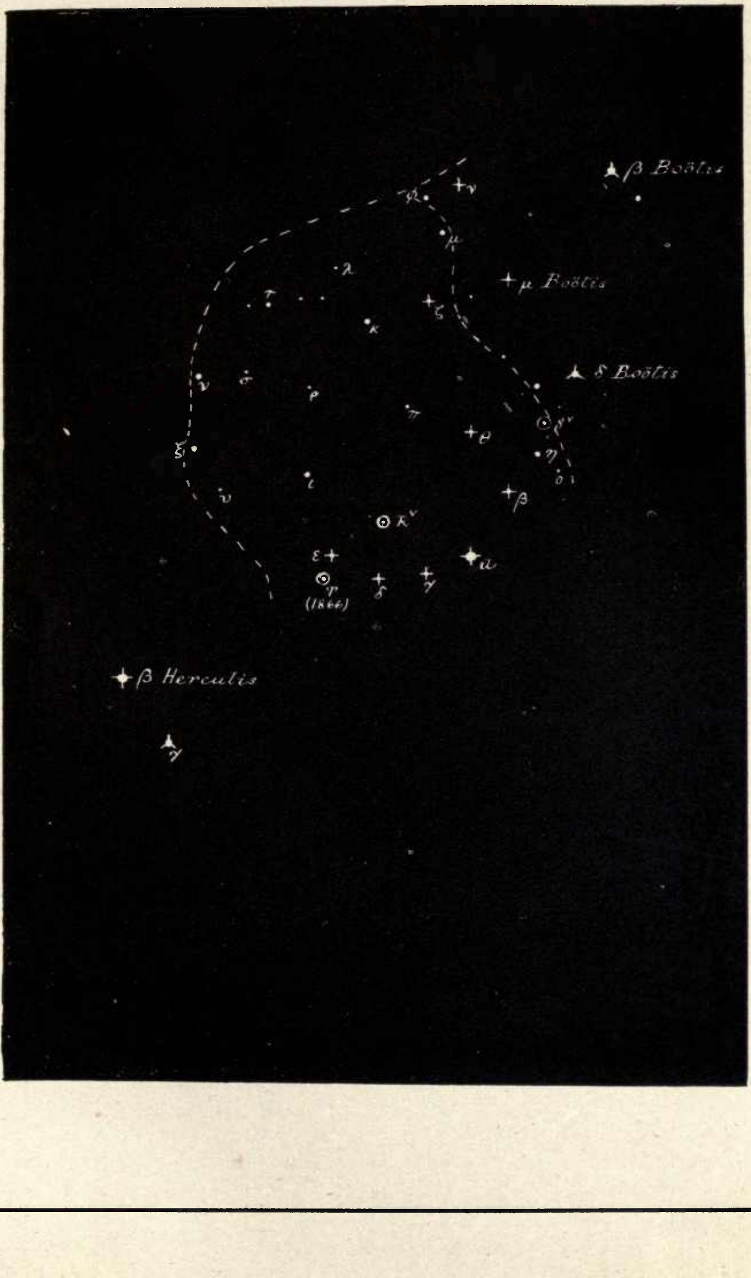
The star η is a remarkable binary with a period of revolution of about 41½ years.

It was about one degree south of ε, that the celebrated Temporary, or "Blaze," star suddenly burst out in the year 1866. It was discovered by the late Mr. Birmingham at Tuam, Ireland, on May 12th of that year, about midnight. When first seen it equalled Alphecca in brightness, but very rapidly diminished in brilliancy, and in about three weeks was reduced to a star of the ninth magnitude. The star was, however, not really a new one, as it had been previously observed by Argelander, and appears on his charts as a star of between the ninth and tenth magnitude.

A line drawn from the star β in the "Plough" to η (Map 3) and produced will pass near Corona.

MAP 21.

CORONA BOREALIS.


β Boötis
μ Boötis
δ Boötis
β Herculis
γ
ν
φ
μ
λ
τ
κ
ζ
ν
σ
ρ
π
θ
ξ
ξ
η
o
ι
υ
β
κ
α
ε
T
(1866)
δ
γ

MAP XXII.

HERCULES.

Map XXII.

HERCULES.

A large constellation lying south of Draco, north of Ophiuchus, and west of Lyra, Vulpecula, Sagitta, and Aquila. Its principal star is α, which is a fine double star, the components being orange and emerald-green. It is also variable to some extent in its light. The other conspicuous stars are β and ζ of $2\frac{1}{2}$ magnitude, δ of the 3rd, γ, η, θ, μ, τ, o, and π of $3\frac{1}{2}$, and ϵ, ξ, and ι of about the 4th magnitude.

The star ι forms with β, γ, and ξ Draconis, a well-marked cross, to the north-west of Vega.

The star ζ is a remarkable binary; period of revolution about 34 years.

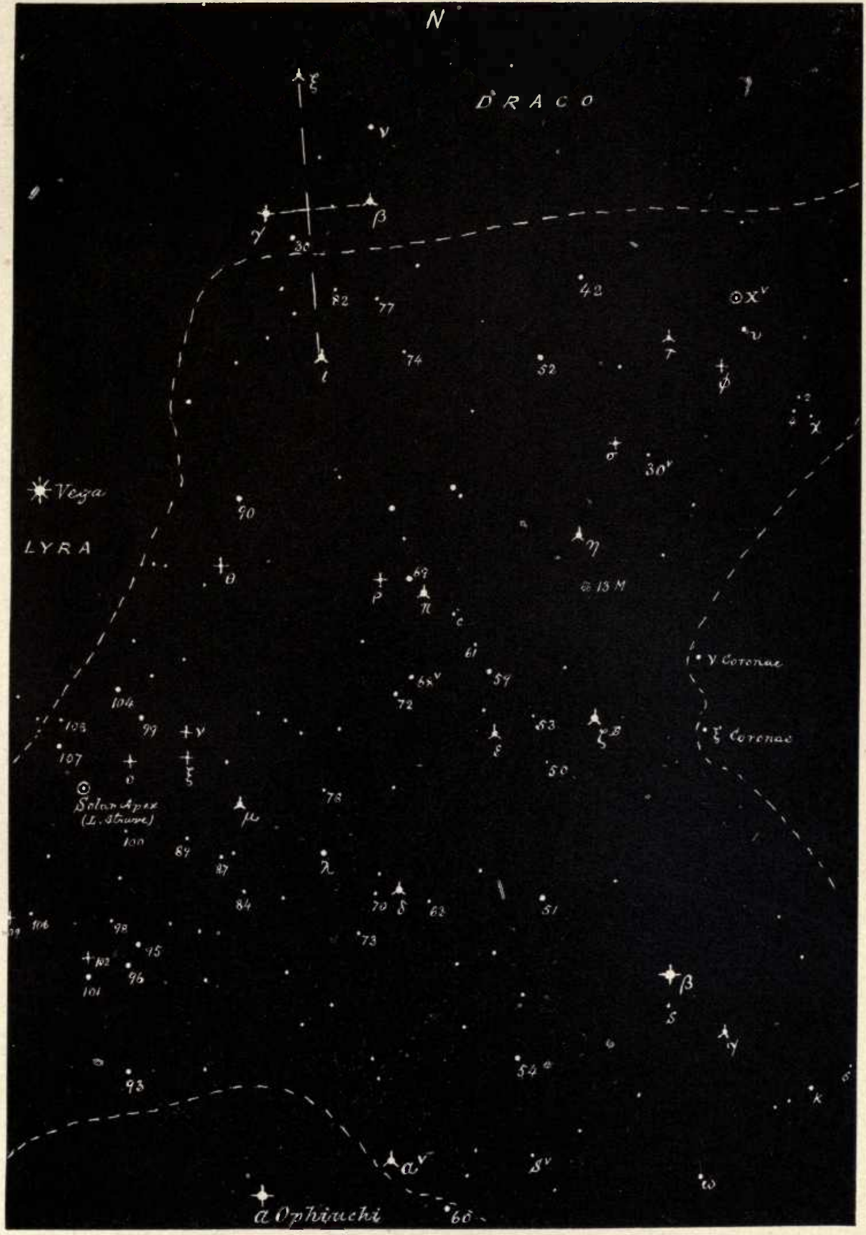
Between η and ζ is situated the magnificent globular cluster of stars known as 13 Messier. It may be just detected with the naked eye on a clear night. It is a splendid object in a good telescope.

The stars numbered 30 and 68 are variable in light, and so is the star marked X, north of υ, the variability of which was discovered by the present writer in 1890.

From observations of the proper motions of stars, astronomers have come to the conclusion that the sun, with all its attendant planets and satellites, is speeding through space towards a point in this constellation. The accuracy of this conclusion has been fully confirmed, and a recent investigation by M. L. Struve places the exact spot near o Herculis, as shown on the map.

MAP 22.

HERCULES.


N
ξ
DRACO
ν
β
γ
30
42
χ^v
82
77
υ
τ
ι
74
52
φ
χ
σ
30^v
Vega
90
LYRA
η
θ
69
ρ
π
13 M
c
61
γ Coronae
68^v
59
72
104
105
99
ν
53
ζ B
ε
ξ Coronae
107
ο
ξ
50
Solar Apex
(L. Struve)
μ
78
100
89
87
λ
84
70
δ
62
51
109
106
98
95
102
96
101
β
δ
γ
54
93
κ
α^v
S^v
ω
α Ophiuchi
60

MAP XXIII.

VIRGO.

MAP XXIII.

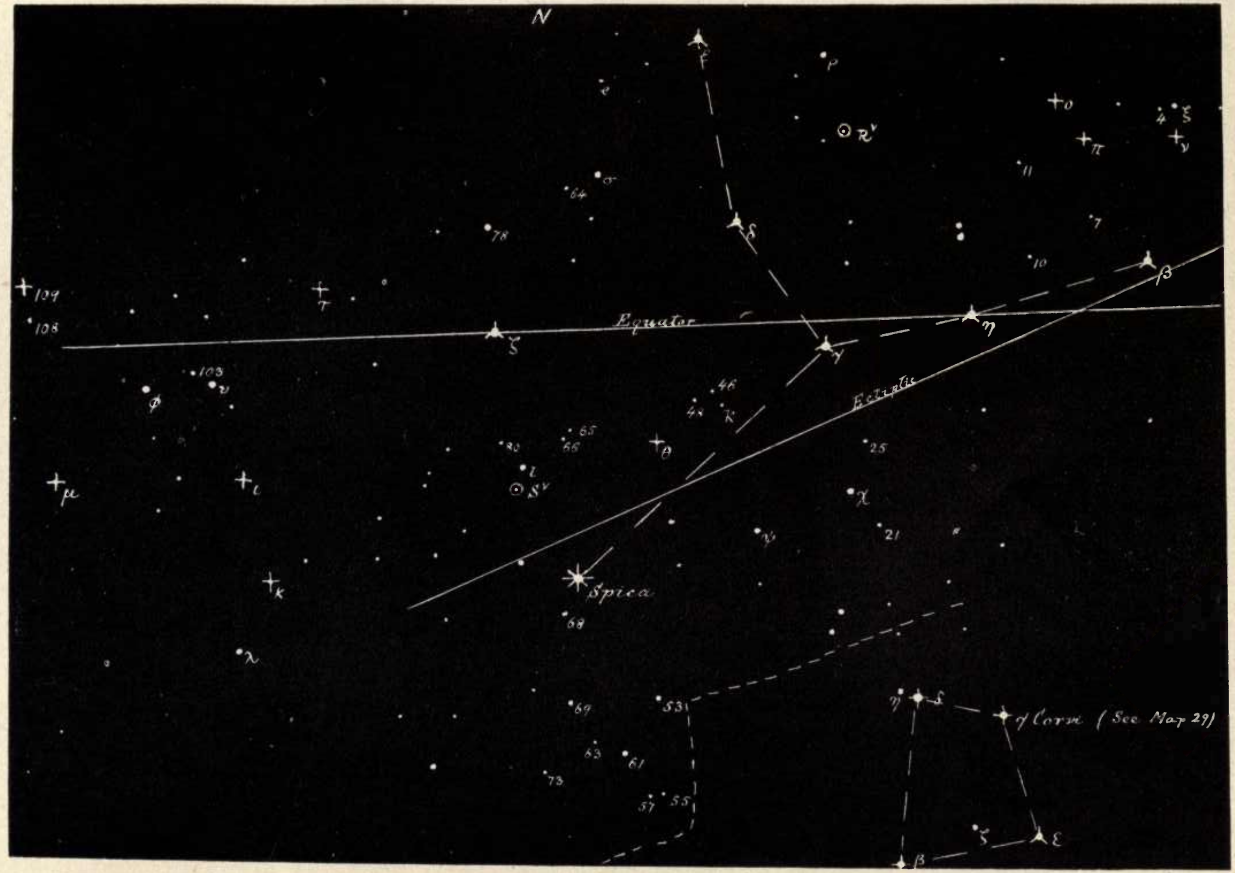
VIRGO.

VIRGO, the Virgin, is one of the constellations of the Zodiac, and contains a number of interesting objects. It lies between Leo and Libra, and has Coma Berenices and Boötes on the north, and Corvus, Crater, and Hydra on the south. Its principal star is Spica of the first magnitude. The other bright stars are β, η, γ, δ, and ϵ, which form with Spica an irregular Y-shaped figure, and ζ, which marks the equator. γ is one of the most famous binary stars known. The period of revolution is about 185 years. It is at present an easy object even with a 3-inch telescope. To the west of δ and ϵ there is a rich nebular region.

The star marked R is a remarkable variable, varying from 6½ to 11th magnitude, with a period of about 146 days. The star marked S is a long period variable, varying from 5·7 magnitude to 12½ magnitude with a period of 376 days.

MAP 23.

VIRGO.



N
ε
ρ
R^v
ο
ξ
4
π
ν
11
σ
64
δ
78
7
10
β
109
τ
108
Equator
ζ
η
γ
103
υ
φ
46
48
Ecliptic
65
66
θ
25
20
l
S^v
μ
ι
χ
ψ
21
κ
Spica
68
λ
69
53
η
δ
γ Corvi (See Map 29)
63
61
73
57
55
ζ
ε
β

MAP XXIV.

SERPENS AND OPHIUCHUS.

MAP XXIV.

SERPENS AND OPHIUCHUS.

SERPENS, the Serpent, is a long and narrow constellation extending from a point south of Corona Borealis, below Hercules, through Ophiuchus, and up to ζ Aquilæ (Map 8). Its principal bright stars are α of $2\frac{1}{2}$ magnitude, μ, β, η, δ, and γ about $3\frac{1}{2}$, and θ and κ of about fourth magnitude. δ is a double star, and may be seen with a good 3-inch telescope. θ is a wide double.

About 8 degrees to the south-west of α is a fifth magnitude star, numbered 5, also double; closely north of this is a fine globular cluster, 5 Messier.

A little south of β and γ is a long period variable star, R Serpentis. It varies from 5·6 to thirteenth magnitude, with a period of about 358 days. A maximum of this star will be due about December 1st, 1891.

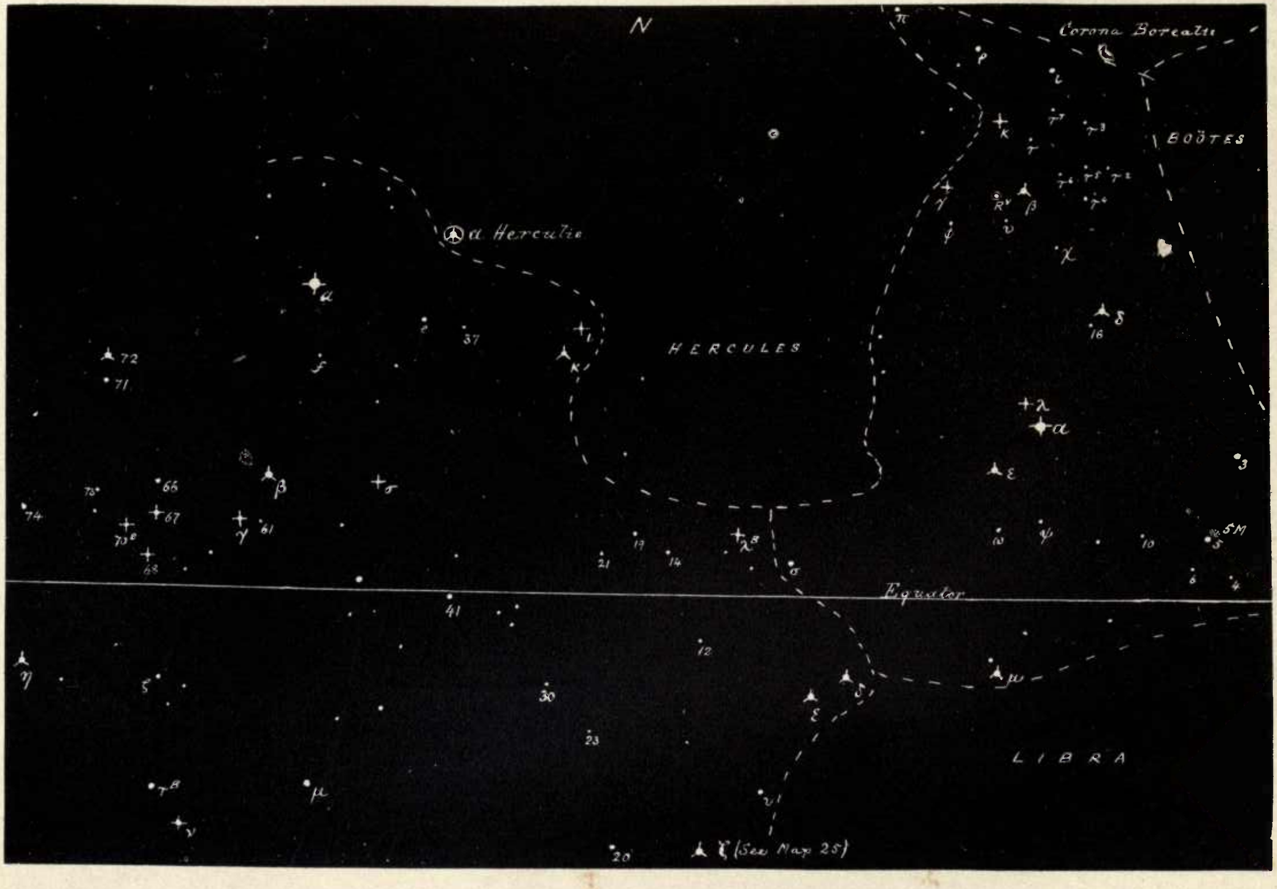
OPHIUCHUS, or the Serpent-Bearer, lies south of Hercules (Map 22) and north of Scorpio (Map 25). Its principal stars are α of the second magnitude, δ and ζ of $2\frac{1}{2}$, and β and κ of the third. The star numbered 70 is a fine double star and a remarkable binary, the period of revolution being about 88 years, according to an orbit recently computed by the present writer. λ and τ are also binaries, but with longer periods.

A little north of β is a fine open cluster of small stars, which may be seen with an opera glass.

An isosceles triangle is formed by Vega, Altair, and α Ophiuchi, Altair being at the vertex. About 5 degrees west of α, and a little north of it, is α Herculis (Map 22).

MAP 24.

SERPENS AND OPHIUCHUS.


N
π
Corona Borealis
ρ
ι
κ
τ
BOÖTES
γ
φ
β
υ
χ
α Herculis
α
e
37
ι
κ
f
72
71
HERCULES
δ
16
λ
α
ε
β
σ
66
73
74
67
γ
61
70
68
21
19
14
λ
σ
ω
ψ
10
5M
5
3
6
4
Equator
41
12
η
ξ
30
μ
δ
ε
23
LIBRA
τ
μ
ν
ν
20
ζ (See Map 25)

MAP XXV.

SCORPIO.

Map XXV.

SCORPIO.

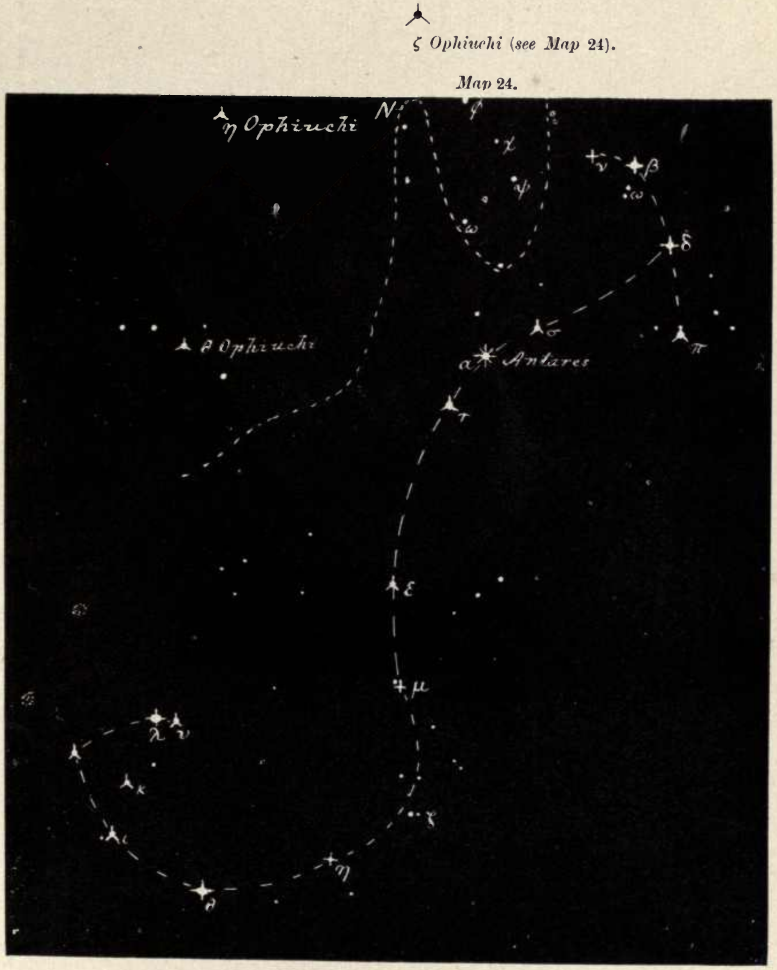
Scorpio, the Scorpion, is a very brilliant constellation in southern latitudes. It lies between Libra and Sagittarius, and south of Ophiuchus. It may be easily distinguished by its curve of rather bright stars, supposed to represent a scorpion. Its principal star is Antares, a reddish star of about magnitude 1½, which is visible near the Southern horizon in the summer months in England. Antares has a close companion of about the eighth magnitude, of a greenish colour.

There are some fine star clusters in the Southern portion of the constellation, but these do not rise above the English horizon.

The greater part of Scorpio is situated in one of the brightest portions of the Milky Way, which is here broken up into a number of bright spots covering a considerable area.

MAP 25.

SCORPIO.


ζ Ophiuchi (see Map 24).
Map 24.
η Ophiuchi
N
φ
χ
ψ
ω
ν
β
ω
δ
σ
π
θ Ophiuchi
α
Antares
τ
ε
μ
λ
υ
κ
ι
ζ
η
θ

MAP XXVI.

CAPRICORNUS.

MAP XXVI.

CAPRICORNUS.

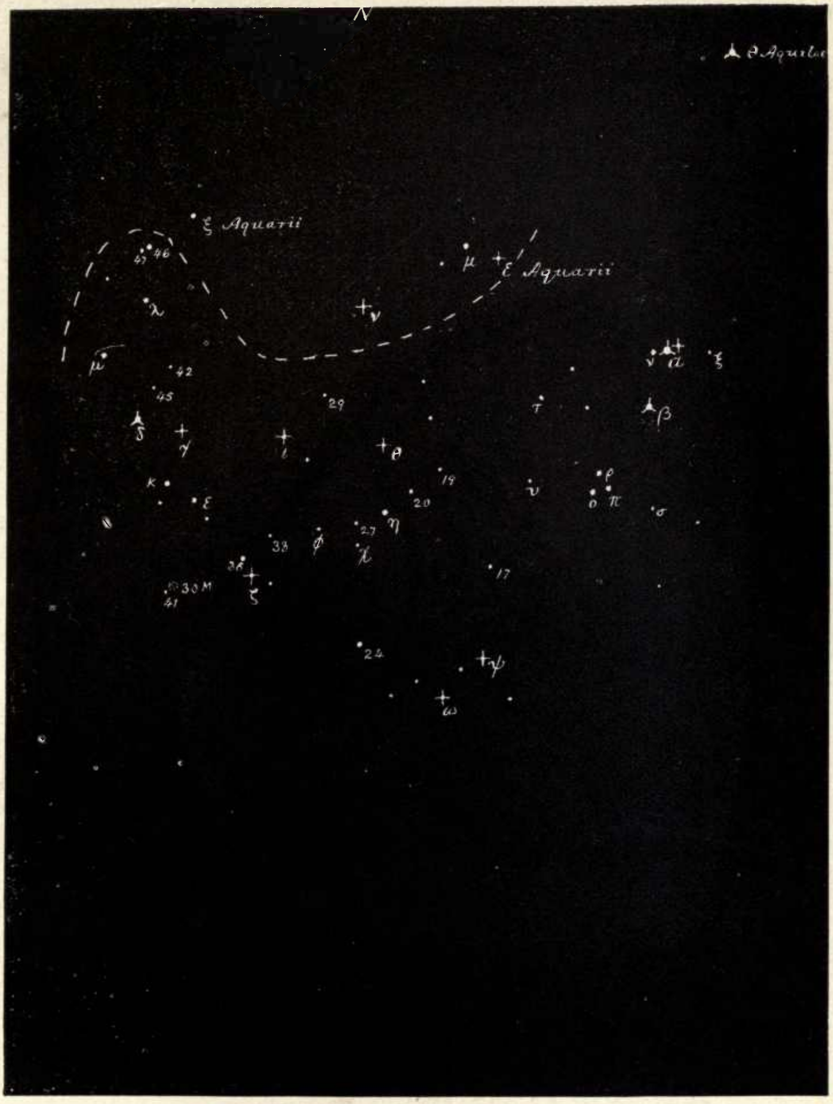
CAPRICORNUS, the Goat, is another of the signs of the Zodiac, and lies between Aquarius and Sagittarius. Its principal stars are α, β, and δ of the third magnitude and γ, ζ, and θ of the fourth. α consists of two stars, α^1 and α^2, very close together, at least to the naked eye. There is a small star known as ν to the east of the pair.

Close to the star numbered 41 is the cluster known as 30 Messier.

The three stars γ, α, and β Aquilæ point southwards to Capricornus.

MAP 26.

CAPRICORNUS.


N
θ Aquilae
ξ Aquarii
47
46
μ
ε Aquarii
λ
ν
μ
42
45
29
ν
α
ξ
τ
β
δ
γ
ι
θ
19
ρ
κ
ε
20
υ
ο
π
σ
η
27
38
φ
χ
36
ζ
17
30 M
41
24
ψ
ω

MAP XXVII.

AQUARIUS.

MAP XXVII.

AQUARIUS.

AQUARIUS, the Water-Bearer, is one of the signs of the Zodiac, and lies between Pisces, Pegasus, and Equuleus on the north, and Piscis Australis, and Capricornus on the south. Its principal stars are α and β of the third magnitude, δ of 3½, ζ of 3·7, and γ of the fourth.

ζ is a binary star, but the period is very long, about 1,600 years. It may be well seen with a good 3-inch telescope, the components being about 4 and 4½, and distance about 3½ seconds.

The star marked R, south of ω^2, is a remarkable variable, varying from 5·8 to about the eleventh magnitude, with a mean period of about 387 days.

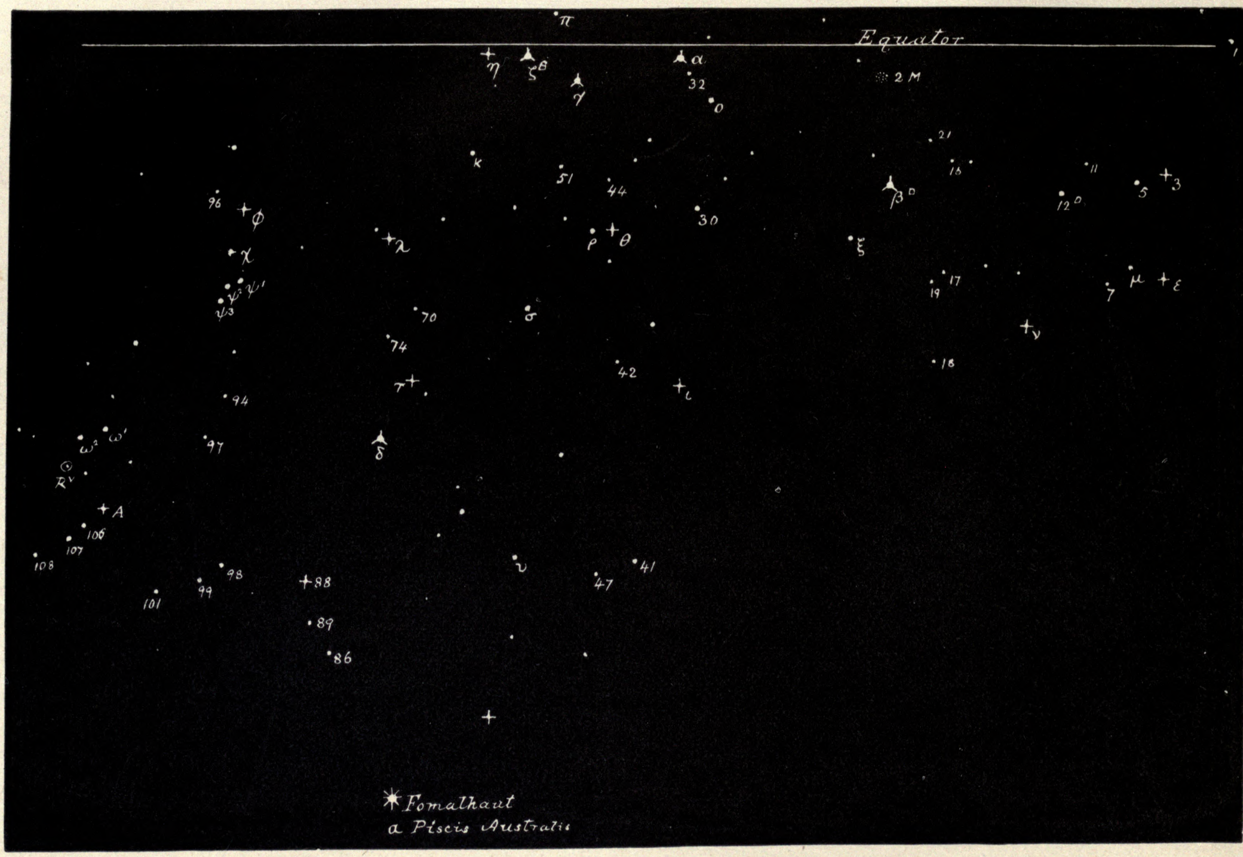
About 5 degrees north of β is a fine globular cluster of minute stars, known as 2 Messier.

The greater portion of Aquarius lies south of the celestial Equator, which runs a little north of α, ζ, and η.

A line drawn from Vega through the Dolphin's rhomb will pass through Aquarius.

MAP 27.

AQUARIUS.


π
Equator
1
η
ζ
γ
α
32
o
2 M
21
16
k
51
44
11
β
5
3
96
φ
30
12
λ
ρ
θ
ξ
χ
ψ²
ψ¹
ψ³
17
19
μ
ε
7
70
σ
74
ν
18
42
ι
τ
94
ω²
ω¹
97
δ
R
A
106
107
108
υ
41
98
88
47
99
101
89
86
Fomalhaut
α Piscis Australis

MAP XXVIII.

CETUS.

Map XXVIII.

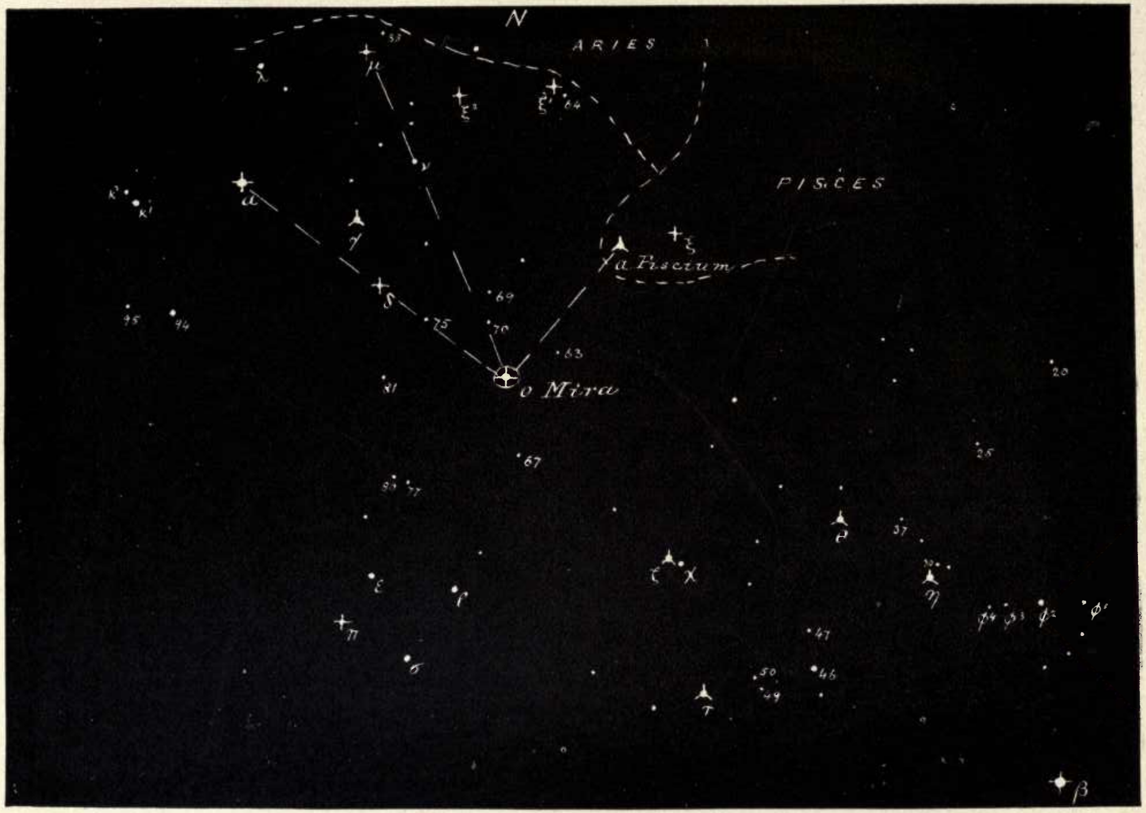
CETUS.

Cetus, the Whale, is a large constellation, situated south of Aries and Pisces. It contains no star brighter than the second magnitude. α lies nearly in a straight line with β Andromedæ and α Arietis.

The most interesting object in this constellation is *o*, or Mira, the "wonderful" star, perhaps the most remarkable variable star in the heavens. For about five months of the year this extraordinary object is quite invisible to the naked eye. It increases gradually for about three months up to the maximum, when it sometimes reaches the second or third magnitude. Its light then remains nearly constant for about a month, when it again begins to diminish and at minimum is reduced to a star of about magnitude 9½. It seems to have attained a greater brilliancy in former years, for in 1779 Sir W. Herschel rated it but little inferior to Aldebaran! The mean period between the maxima is about 331 days, but it is subject to some irregularities.

MAP 28.

CETUS.


N
ARIES
PISCES
α Piscium
o Mira
λ
μ
53
ξ²
ξ¹
64
ν
α
κ
κ¹
γ
ξ
δ
69
75
70
63
95
94
81
67
77
ε
ρ
π
σ
ζ
χ
θ
57
η
φ⁴
φ³
φ²
φ¹
47
46
50
49
τ
20
25
β

MAP XXIX.

CORVUS AND CRATER.

Map XXIX.

CORVUS AND CRATER.

Corvus, the Crow, is a small constellation, of which the brighter stars form a trapezium. It lies south of Virgo, and north of Hydra, and may be seen in the summer months above the Southern horizon in England. It is supposed to represent a crow standing on the back of Hydra.

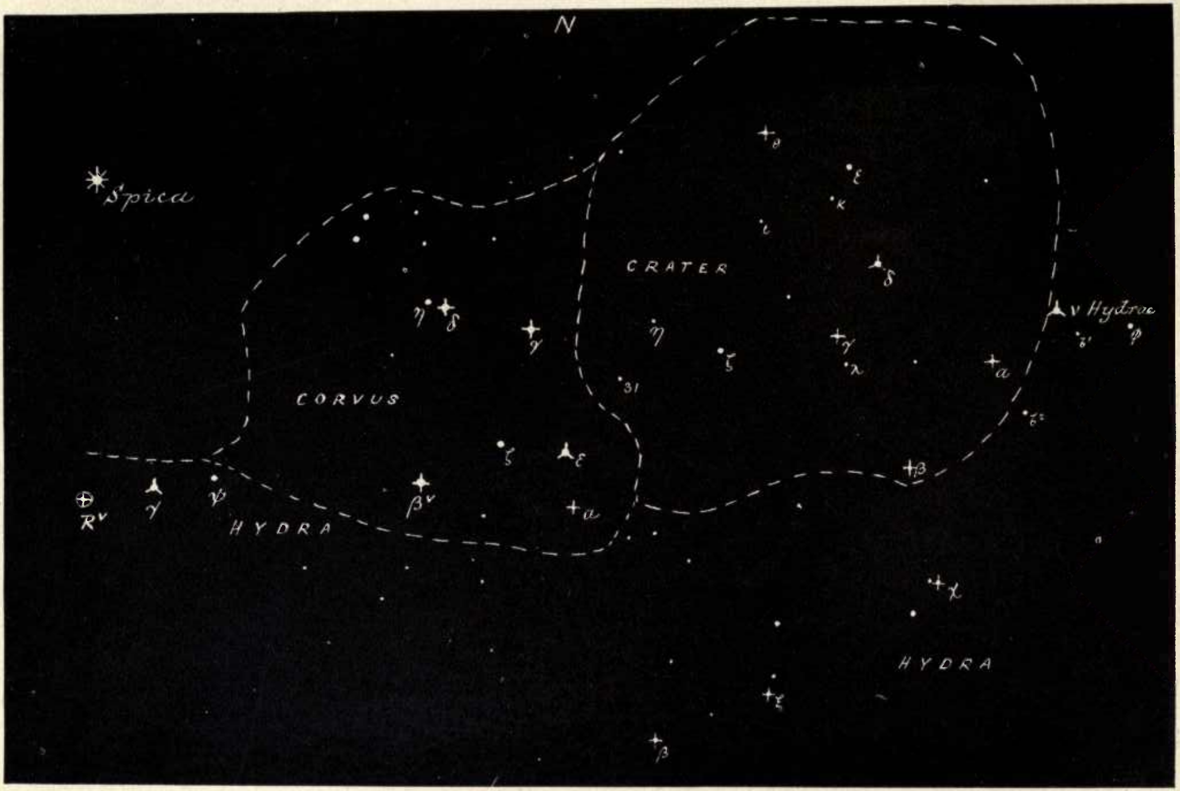
A line from γ to δ nearly points to Spica (α Virginis, Map 23).

To the west of Corvus is Crater, or the Cup, a small constellation of which the only tolerably conspicuous stars are δ and γ of the 4th magnitude.

R Hydræ, the position of which is shown on the map, is a remarkable and interesting variable star. It varies from about the 4th magnitude to nearly the 10th, with a mean period of about 434 days.

MAP 29.

CORVUS AND CRATER


N
Spica
CRATER
CORVUS
HYDRA
HYDRA
ν Hydræ
θ
ε
κ
ι
δ
η
ζ
γ
λ
α
β
31
φ
$ζ^1$
$ζ^2$
η
δ
γ
ζ
ε
$β^v$
α
ψ
γ
R^v
χ
ξ
β

MAP XXX.

THE SOUTHERN CROSS.

Map XXX.

THE SOUTHERN CROSS.

This famous group is not visible in England, but is a conspicuous object in the Southern heavens. It has formed a subject of interest since the earliest ages. Its component stars are not however so brilliant as many suppose, the magnitudes being, according to Dr. Gould, α, 1·3; β, 1·7; γ, 2·0; δ, 3·4, and ε, 4·0.

A line from δ to β points to β Centauri, a star of the first magnitude. Near this is a still brighter star, α Centauri, which is remarkable as being the nearest of all the fixed stars to the earth and also an interesting binary or revolving double star.

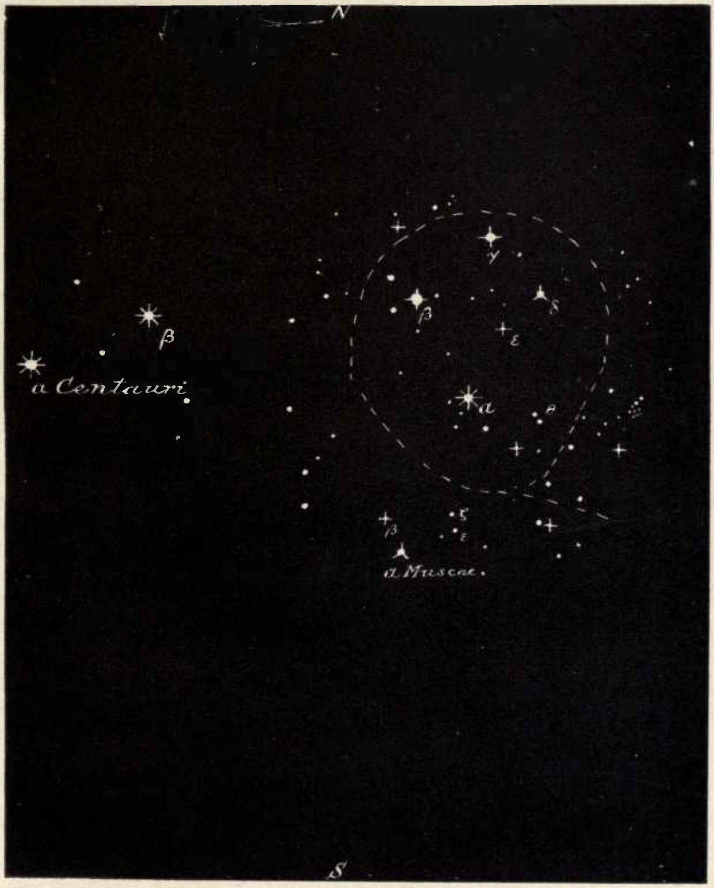
The region south preceding the Cross is very rich in naked-eye stars. The Cross itself lies in one of the brightest portions of the Milky Way, which adds to the effect of this well-known group. It lies on the edge of the well-known "coal sack," which seems to be an opening through the Milky Way zone.

At one period—some 5,000 years ago—the Southern Cross was visible in the latitude of London, but owing to "the Precession of the Equinoxes" it has now moved too far south to be seen except in low latitudes.

Surrounding κ, a little south of β, is a magnificent cluster of small stars of various colours. α is a multiple star having two bright companions and three faint ones.

MAP 30.

THE SOUTHERN CROSS.


N
γ
δ
β
ε
α
θ
β
a Centauri
ζ
ε
β
a Muscae.
S

INDEX.

MAP
Andromeda 10
Aquarius 27
Aquila 8
Aries 13
Auriga 12
Bear, Great 3
Bear, Little 4
Boötes 20
Canis Major 17
Canis Minor 15
Capricornus 26
Cassiopeia 5
Cepheus 6
Cetus 28
Chair of Cassiopeia 5
Coma Berenices 19
Corona Borealis 21
Corvus 29
Crater 29
Cross, Southern 30
Cygnus 7
Delphinus 8
Gemini 15

MAP
Hercules 22
Hyades 14
Leo 18
Lepus 17
Lyra 7
Northern Hemisphere 1
Ophiuchus 24
Orion 16
Pegasus 9
Perseus 11
Pleiades 14
Plough 3
Sagitta 8
Scorpio 25
Serpens 24
“ Sickle ” in Leo 18
Southern Cross 30
Southern Hemisphere 2
“ Square of Pegasus ” 9
Taurus 14
Ursa Major 3
Ursa Minor 4
Virgo 23

14 DAY USE
RETURN TO DESK FROM WHICH BORROWED
ASTRON-MATH-STAT.
LIBRARY
This book is due on the last date stamped below, or
on the date to which renewed.
Renewed books are subject to immediate recall.

MAY 24 1969
MAR 8 1971
~~APR 1 1971~~
~~MAY 4 1972~~
~~FEB 12 1974~~
~~JAN 11 1980~~
~~End of Sum '80~~
~~AUG 13 1980~~
Due end of W[illegible] quarter
Subject to recall after —
~~MAR 0[illegible] 1983~~

Due end of SPRING quarter
~~Subject to recall after —~~
APR 01 1982
~~JUN 2 1986~~
~~MAY 19 1989~~
Rec'd UCB A/M/S
AUG 17 1995

LD 21–10

LD 21–40m-10,'65
(F7763s10)476

General Library
University of California
Berkeley

U. C. BERKELEY LIBRARIES

S C044695462

QB63
G6

QB
63
G67
1891
ASTR

M677240

Ex Libris

ASTRONOMICAL · SOCIETY · OF · THE · PACIFIC